ST-5000FW

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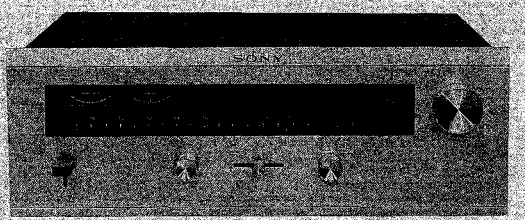

FM STEREO TUNER

Specifications

Circuit:	All silicon transistor *FM* stereo tuner Superheterodyne, 43 transistors (including 5 Field-Effect Transistors), 34 diodes
Frequency range:	87–108 MHz
Intermediate frequency:	10.7 MHz
Antenna input impedance:	300 ohms (balanced), 75 ohms (unbalanced)

***Frequency* Response:**	20 to 15,000 Hz ±0.5 db
Usable sensitivity: (IHF)	1.5 μV
Power requirements:	AC 117 volts, 60 Hz
Power consumption:	20 watts, 23 VA
Indicators:	Tuner input meter, Tuning meter, Stereo indicator (lamp)
Dimensions:	3-3/4(h) × 15-3/4(w) × 12-1/4(d)"
Weight:	20 lb 14 oz

SONY®

SERVICE MANUAL

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SECTION 1

GENERAL DESCRIPTION

Technical Specifications

Circuit:	All silicon transistor FM stereo tuner Superheterodyne, 43 transistors (including 5 Field-Effect Transistors), 34 diodes

FM Section (Monophonic)

Frequency range:	87-108 MHz
Intermediate frequency:	10.7 MHz
Antenna input impedance:	300 ohms (balanced), 75 ohms (unbalanced)
Frequency Response:	20 to 15,000 Hz ±0.5 db
Usable sensitivity: (IHF)	1.5 μV
Quieting sensitivity:	1.0 μV (300 ohm) for 30 db of quieting 3.0 μV (300 ohm) for 50 db of quieting 100 μV (300 ohm) for 70 db of quieting
Image rejection: (IHF)	Better than 90 db
IF rejection: (IHF)	Better than 100 db
Spurious rejection: (IHF)	Better than 100 db
Alternate channel selectivity (IHF):	Better than 90 db
Capture ratio: (IHF)	1.0 db
AM suppression: (IHF)	Better than 50 db
Harmonic distortion: (1000 μV input)	Better than 0.2% at 100% modulation
Frequency drift: (100 MHz)	Less than ±20 kHz at 23-131°F
Hum and noise:	70 db down
Muting operation level:	3 μV~26 μV (continuously variable)

FM Section (Stereophonic)

Stereo operation sensitivity:	3 μV
Stereo separation:	Better than 40 db, at mid-frequency, 100% modulation Better than 30 db, at 50 Hz, 100% modulation Better than 30 db, at 10 kHz, 100% modulation
	Better than 20 db, at 15 kHz, 100% modulation
Frequency response:	30 to 15,000 Hz ±0.5 db
Harmonic distortion: (1000 μV input)	Less than 0.35%, at 400 Hz, 100% modulation
SCA suppression:	50 db
19 kHz (pilot), 38 kHz (sub-carrier) suppression:	Better than 70 db
Audio outputs: (at 400 Hz, 100% modulation)	Each channel FIXED 700 mV, impedance 10k ohms VARIABLE 0~2V, impedance 1k ohms at maximum output

General

Power requirements:	AC 117 volts, 60 Hz
Power consumption:	20 watts, 23 VA
Indicators:	Tuner input meter, Tuning meter, Stereo indicator (lamp)
Dimensions:	3-3/4(h)×15 3/4(w)×12-1/4(d)"
Weight:	20 lb 14 oz

General Information

The SONY ST-5000 FW is one of the most advanced FM Stereo tuners available today. Its front end employs new and revolutionary silicon field-effect transistors that yield excellent sensitivity and noise figure, and at the same time can handle very strong signals without overload.

FET's in the local oscillator section also afford great stability and freedom of drift due to temperature. This negates the need for automatic frequency control and greatly simplifies the tuning operation for the set owner.

Nine IF stages, that employ three multi-unit solid-state filters, provide high sensitivity, very sharp response and an essentially flat response within the selected channel. This results in excellent adjacent-channel rejection and very low distortion.

A unique electronic switching system in the multiplex section gives smooth and clickless switching between mono and stereo modes of operation. Switching is fully automatic and immune to the effects of inter-station noise.

An ingenious muting circuit, employing one FET and nine transistors, cuts out inter-station noise without killing those weak stations. This combination results in a receiver capable of "pulling-

in" the weakest stations while preserving a smooth and quiet tuning operation.

Excellent stereo separation is maintained under all receiving conditions.

Caution

The ST-5000 FW is a precision instrument. It should be serviced only by qualified service personnel trained in the service of high-quality instruments of this type.

Circuit Description

The following describes the functions of all stages and controls. The description follows the signal path and lists stages by the transistor symbol number at the left margin. Refer to the block diagram on page 9 and the schematic diagram on page 25～28.

Front-end Section

Stage/Control	Function
Balun B 101	This transformer matches either 75-ohm coaxial cable or 300-ohm twin lead to the tuner's input stage.
RF Amplifier X 101, X 103	The two RF amplifiers are designed to provide stable amplification, sharp selectivity at FM broadcast frequencies, and optimum noise figure. Field-effect transistors are ideally suited for this job as they have characteristics similar to that of triodes, and in addition have wide dynamic range. This results in very low cross-modulation products. The RF stages employ common-gate circuits (similar to grounded-grid circuits). Double-tuned coupling is employed between X 101 and X 103 to provide sharp selectivity, and the windings of L 101 and L 103 are tapped-down to match the low input impedance of the common-gate stage.
Local Oscillator X 106	This stage supplies injection signals to the mixers via L 105 and C 116. The circuit is a Hartley type with feedback applied to the source from the tap on L 106. Temperature charges have little effect on oscillator tuning in FET circuits so that this oscillator is extremely stable.
Mixer X 105	RF signals and local-oscillator signals are heterodyned in the gate-source junction of X 105 to produce the 10.7 MHz output. IFT 101 is a tuned transformer to develop the IF output and provide sharp selectivity. A low impedance output winding supplies link coupling to the IF section.

IF Amplifier Circuit Board

Stage/Control	Function
IF Amplifiers X 201, 202, 203, 204	These IF stages are basically RC coupled amplifiers that provide essentially flat response.
Solid-State Filters MF-1, 2, 3	The selectivity of this section is determined by three solid-state filters in the interstage coupling paths. These filters each have four-section ceramic filters that operate in "trapped-energy" modes. The filters provide extremely sharp skirt selectivity and flat response inside the pass band. These filters determine over-all selectivity in the tuner.
Diode Limiters D 201, 202, 203, 204, 205, 206, 301, 302, 303, 304	Limiting is accomplished by diode pairs, connected in parallel and poled in opposite directions. The diodes conduct when the input signal exceeds the barrier potential of about 0.6 volts. Thus, signal is limited in both directions to 1.2 volts peak-to-peak. The diodes provide symmetrical limiting.
IF Amplifier X 205, 206	The diode limiters are passive, and introduce loss. Therefore amplifiers, such as X 205 supply the interstage gain needed to drive the limiters.
Muting-Circuit Detector X207, D208, 209	The IF signal is extracted from the collector of X 205 to drive the Muting Circuit Detector. X 207 acts as a buffer amplifier to drive the voltage doubler D 208, D 209. The output of this circuit is a positive DC voltage proportional to carrier

Stage/Control	Function
	level. This DC voltage is applied to X 410 on the Muting Circuit Board.
Tuner Input Meter Circuit D 207, R 241	An IF output from the collector circuit of X 206 is coupled through R 232 to D 207. This half-wave rectifier feeds a DC signal to the TUNER INPUT METER M-1. Since all previous stages have fixed gain, the current in M-1 is directly proportional to signal level. R 241 is the calibration adjustment.

Limiter-Detector Circuit Board

Stage/Control	Function
IF Amplifiers X 301, 302	These are conventional RC coupled amplifiers that supply the necessary interstage gain to drive the diode limiters.
Diode Limiters D 301, 302, 303, 304	
IF Output X 303	Signal at the base of X 303 has had all amplitude variations removed by the preceding limiters, and selected signals have been passed by the solid-state filters. X 303 provides the power to drive the ratio detector.
Ratio Detector D 305, 306	IFT 301 and the diodes D 305 and D 306 form a balanced ratio detector that transforms the frequency-modulated signal into an audio signal.
R 319	Output appears across R 322. R 319 is the balance control for the ratio detector.
Tuning Meter M-2	A null-type meter connected across the balanced output of the ratio detector is used as a tuning indicator. C 323 removes the AC component of the signal, and R 330 calibrates the meter for full scale readings.
Emitter Follower X 304	X 304 supplies demodulated signals to the MPX and Muting Circuits.

Multiplex Decoder Circuit Board

Stereo is extracted by a switching or time-division decoder.

Stage/Control	Function
X 501	This stage serves two functions. The composite FM signal is extracted from its emitter circuit, and the 19-kHz pilot signal is taken from a tuned circuit in the collector circuit.
19 kHz Amplifier X 502	The 19-kHz pilot signal, separated by the tuned coupling circuits between X 502, is amplified by X 502 to drive the frequency doubler.
Frequency Doubler D 501, 502	Signals developed at the collector of X 502 are transformer coupled to a full-wave rectifier D501, 502. The output of this rectifier is not filtered, and produces two positive pulses for each input cycle. Thus the 19-kHz frequency is effectively doubled by D501 and D502. However, the waveform is not sinusoidal at the base of X 503.
38 kHz Amplifier X 503	The 38 kHz pulses produced by D501, 502 are amplified by X503. The tank circuit in the collector circuit of X 503 is tuned to 38 kHz to restore the sinusoidal waveshape to the signal. This signal is transformer coupled to the bridge-type demodulator to supply the sampling drive for the demodulator.
Pilot and SCA Filters L 505, 506 C 507, 508	The composite signal fed to the demodulator is coupled from the emitter of X 501 through to anti-resonant circuits consisting of C 507/L 505 and C 508/L 506. The first of these is tuned to 19 kHz to eliminate the pilot carrier. The second tank tunes to 67 kHz to eliminate the SCA signal.
Multiplex Demodulator D 503, 504, 505, 506	The demodulator circuit employs four diodes in a balanced bridge arrangement. This system cancels much of the residual RF products. The 38 kHz pulses switch the composite signal in four diodes and switching transformer to produce L and R signals at the output when the tuner operates in the stereo mode.

Stage/Control	Function
De-emphasis C 516, 517	These capacitors are selected to provide the necessary roll-off at high audio frequencies to compensate for pre-emphasis at the transmitter.
Audio Pre-amplifier X 504, 505	Demodulated L and R signals are amplified by these stages.
HI-BLEND Switch SW-2	The HI-BLEND switch allows mixing of high-frequency audio signals between stereo channels. Three different coupling capacitors are used to permit a choice of the mixing bandwidth.
Gain Adjustment R 531, 532	The resistors are selected to compensate for differences in demodulator efficiency and provide equal over-all gain in both channels.
Channel Separation Adj. R 537	The network that connects the emitters of X 504 and X 505 provides a form of negative feedback between left and right channels. Any residual L signals in the R channel are cancelled out by the inverted "L" signal from the L channel. The same is true of residual R signals in the L channel. R 537 is therefore set for maximum channel separation.
Emitter Follower X 506, 507	Emitter followers are used at this point to provide a low-impedance source of signal for the low-pass filters that follow.
Low-Pass Filter LPF 501	The filter removes all residual IF and subcarrier components. It is important that these components be removed completely to prevent beat interference with bias oscillators in tape recorders fed from the tuner.
Audio Amplifier and Emitter Follower X 508, 509, 510, 511	Transistors X 508 and X 509 make up for the insertion loss of the low-pass filter. X510 and 511 act as emitter followers to produce output signals across a low impedance. Positive feedback is employed between the collector of X 510/511 and the emitter of X 508/509 via C 525/526 compensate for the loss of high audio frequencies in the low pass filter.
Output Level R 567, 570	Both fixed and variable outputs are provided. Fixed outputs are obtained from the voltage dividers R 565/567 and R 566/568. Variable outputs are fed from potentiometers R 569, 570.
Mode Switching X 512, 513, 514	These three transistors operate as direct-coupled switches to establish the operating mode.
Mode Switch in MONO position	In the MONO position, the base of X 512 is grounded and X 512 turns off. X 513 is then switched on and X 514 is switched off. When X 514 is off a positive voltage is applied to R577, R517 and R 515 in series. The DC voltage across R 515 is sufficient to hold both D 503 and D 506 in the forward biased conditions. In that case, subcarrier demodulation stops and the L+R signal is fed through both D 503 and D 506 to the left and right channels.
Mode Switch in AUTO position	When stereo signals are received, the DC component of the signal developed by the 38 kHz doubler is coupled through R 509 to turn X 512 on. This turns X 513 off and X 514 on. When X 514 is saturated the forward bias applied to D 503 and D 506 is removed and the demodulator functions in the multiplex mode.
Mode Switch in STEREO position	The switcher circuit X 512, 513, 514 functions in the same way as in the AUTO position, except that the muting relay is controlled by X 514. (See Muting Circuit Board). The effect is to mute all but stereo signals.

Muting Circuit Board

These circuits act to mute output when tuning is between stations or not sufficiently tuned to the center of a channel.

Stage/Control	Function
Interstation Muting X 409, D 401, D 402	The hiss and static of interstation noise is extracted from the emitter of X 304 and applied to the base of X 409. R 420 and

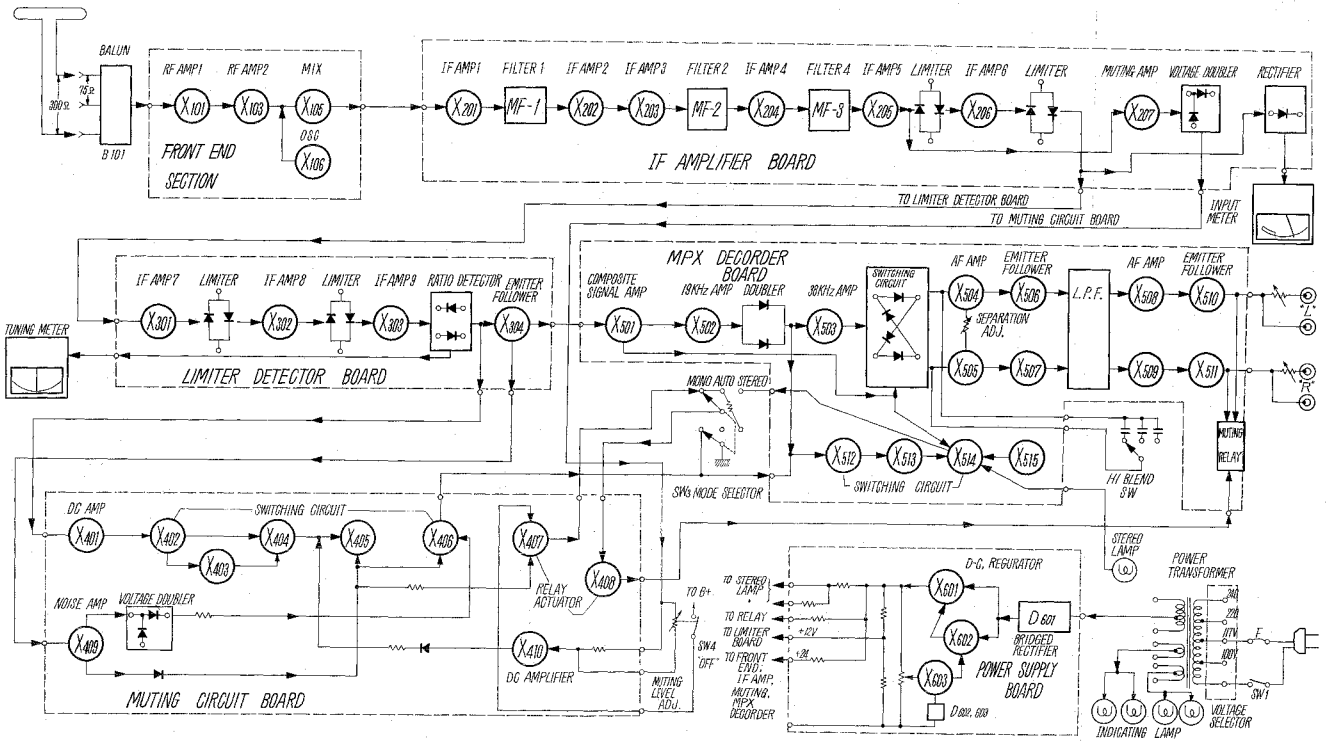
Stage/Control	Function
	C 402, in the coupling circuit, filter out audio components so that the signal is primarily noise. X 409 amplifies the noise component and drives the voltage doubler, D 401, 402. When interstation noise is received the DC output of D 401/402 brings X 406 into conduction. This in turn, cuts off X 407 and the collector voltage of X 407 rises toward B+. The collector of X 407 is coupled to the base of X 408 through the Function Switch SW 3-1 in the MONO and AUTO positions. Thus X 408 turns on as X 407 turns off. The muting relay coil is in the collector circuit of X 408. When this relay energizes, the audio output of both channels is shorted to ground.
Muting Relay Actuator X 407, X 408	
Muting for the Detuned Condition X 401, 402, 403, 404, 405	The muting relay is also actuated if a station is being received but there is a considerable tuning error. This muting circuit operates from the negative or positive output of the ratio detector when the received station is not at the center of the detector's S curve. DC output of the ratio detector, developed across C 321, is coupled to the gate of X 401. The FET, X 401, is biased so that X 402 is ON and X 403 is off when there is zero DC at the ratio detector (correctly-tuned condition). As a result, X404 is on and X405 is off. Note that X 405 and X 406 share a common load. They act as an OR gate. If either X 405 or X 406 is off the muting relay will be de-energized. Thus, when the set is tuned correctly the muting system is inactive. A positive or negative output of the ratio detector triggers the muting system as follows. Consider a positive input to the

Stage/Control	Function
	FET, X 401. The FET conducts more heavily, its drain voltage drops and X 402 cuts off. This makes X 404 cut off as X 404 can conduct only when X 402 is ON and X 403 is off. If the set is detuned to produce a negative output, X 401 conducts less and both X 402 and X 403 come into conduction. In this case, as noted above, X404 cuts off. Thus, X 404 cuts off if the output of the ratio detector is at its positive or negative peak. When X 404 cuts off, X 405 comes into conduction, and following the previously described action of X 407/408, the muting relay energizes.
Muting Level Adj. X 410 VR 401	In addition to interstation and detune-muting, the muting relay is also actuated if signal level is below the value set by the front-panel muting control. This system operates from the DC output of the carrier level detectors D 208, 209. The positive voltage developed by D 208, 209 is applied to the base of X 410. This transistor is normally cut off, but if the DC output of D 208, 209 swings positive enough, X410 conducts and X405 cuts off. The later results in the release of the muting relay. The positive voltage required to turn on X 410 is determined by the setting of the MUTING control VR 401.
Muting Switch SW 4	The muting system is disabled when the MUTING control is turned fully counterclockwise. In this case SW-4 closes putting a positive voltage at the base of X 407 through R 416. This turns on X 407 and keeps X 408 and the muting relay turned off.
Muting in the Stereo Position of the Function Switch	When the Function Switch is in the STEREO position, X 408 is controlled by X 514. The latter is ON when 19-kHz pilot signals

Stage/Control	Function
	are detected in the D 501, 502 circuit. When X 514 is ON, X 408 and the muting relay are off. If the level of pilot signal should drop so that X 514 turns off, X 408 will conduct and mute the output. Thus the tuner is muted except when a stereo signal is received.
Stereo Lamp PL-5	The stereo lamp lights when X 514 is ON. X 514 acts as the ground return for the lamp when the transistor is switched into conduction.
Click Suppressor X 515	Transistor X 515 is a click suppressor. It acts to mute audio output electronically when the MODE switch is turned, or if the muting relay is energized. When X 515 conducts, the discharge of C 531 in its collector circuit places a momentary reverse bias on diodes D 503 and D 506 to block audio output. X 515 receives positive turn-on voltages from either of two sources. One is a set of make-before-break contacts on the MODE switch SW 3-4. The other is the emitter of X408, the muting relay driver. Capacitor C 532, in the base circuit of X 515 acts to delay the application of electronic muting to provide "clickless" operation.
Power Supply	
AC Input	Line input is supplied to the power transformer through the power switch SW-1, the fuse and the voltage selector.
Voltage Selector	The voltage selector sets up the proper power transformer connections to suit local line-voltage conditions.
DC Power Supply D 601	A positive 24 volts is developed by the full-wave bridge rectifier D 601.
Voltage Regulator X 601, 602, 604 D 602, 603	DC output from the rectifiers is filtered by C 601 and applied to the series regulator X 601.

Stage/Control	Function
	Transistor X 603 compares a sample of the output voltage, picked off at VR 601, with a reference voltage supplied by the Zener diodes D 602 and D 603. A change in output voltage, detected by X 603 results in a change in conduction of X 602 and X 601 that offsets the original voltage shift.
DC Voltage ADJ. VR 601	VR 601 adjusts the conduction of the series regulator to produce a standard output of +24 volts. The 24-volt output is supplied to various circuits through isolating resistors R608, 609, 610, 611. A voltage divider, R 606/R 607 provides a +12-volt output for the muting circuits and the stereo lamp.

Block Diagram



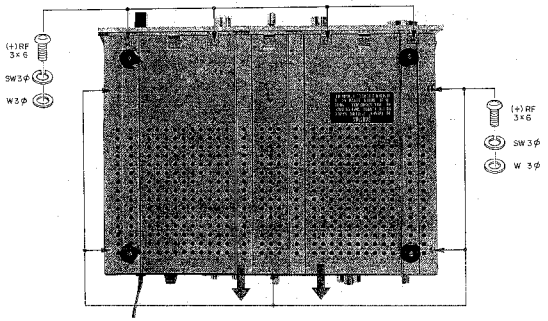
Section 2
DISASSEMBLY

2-1. Removal of Top Cover and Bottom Plate

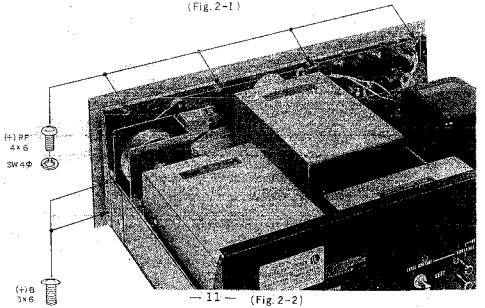
(a) Remove the two machine screws at each side of the tuner and lift the top cover straight up.
(b) Remove the five Phillips-Head screws at the bottom of the tuner and pull the bottom plate towards the rear of the tuner. See Fig. 2-1.

2-2. Front Panel Removal

(a) Remove the top cover.
(b) Remove all control knobs. Tuning, Muting, and Hi-Blend knobs can be removed by loosening the slotted set screws and pulling the knobs straight out. The Power and Mode switch knobs are simply pulled off.
(c) Remove the four Phillips-Head screws (+RF 4 ×6) behind the top edge of the Front Panel Assembly (the vertical bracket that mounts the dial and tuning meters). See Fig. 2-2.
(d) Turn the tuner over and remove the four Phillips-Head screws (+RF 3×6) at the front-bottom edge of the chassis See Fig. 2-1. This frees the front panel.



(Fig. 2-1)



(Fig. 2-2)

2-3. Removal of the Front-Panel Assembly

The Front Panel Assembly is the vertical bracket at the front of the tuner to which the glass dial, tuning meters and pilot lamps are assembled. The Front Panel Assembly must be removed to re-string the dial cord. Follw this procedure :

(a) Remove the cover and bottom plate. See 2-1. It is not necessary to remove the Knobs or Front Panel.

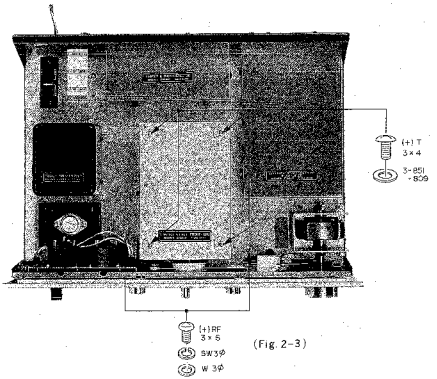
(b) Remove the all pilot lamp sockets by turning them clockwise and pulling them out of the Front panel Assemblies.

(c) Disconnect the leads from the terminals of the tuning meter.

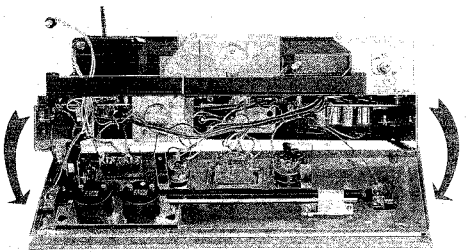
(d) Remove the two machine screws (+B3ϕ×6) on both sides of the chassis. See Fig. 2-2.

(e) Remove the two Phillips-Head screws (+RF 3ϕ ×6) from the top of the chassis, on either side of the Front-End sub chassis. See Fig. 2-3.

(f) The Front Panel Assembly is now free, and can be tilted forward and down as shown in Fig. 2-4. Place protective pads under the Front Panel to keep it from being scratched.



(Fig. 2-3)



(Fig. 2-4)

2-4. Removal of Sub-Chassis Shields

(a) Remove the cover and bottom plate. See 2-1.
(b) To remove the shield cover for the Front End Section, remove the four Phillips screws (+T3 ×4), and lift off the shield cover. See Fig. 2-3.
(c) To remove the shield cover on the IF-DETECTOR section, rest the tuner on its top and squeeze the four spring clips with long-nosed pliers from the bottom of the chassis. See Fig. 2-5.

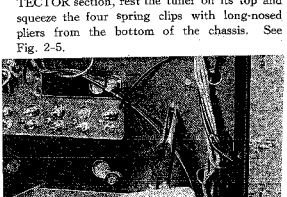


Fig. 2-5

2-5. Pilot Lamp Replacement

(a) Unplug the AC power cord.
(b) Remove the top cover. See Section 2-1.

Meter Lamps

(c) Turn the black-plastic lamp sockets clockwise (as viewed from the back of the panel) and pull out the socket.
(d) Unscrew the pilot lamp from the socket and install the replacement.
(e) Insert the socket into the slots in the Front Panel assembly and turn the socket counterclockwise until the socket is firmly seated.

Stereo Lamps

(f) Turn the black-plastic socket clockwise until it becomes free of the mounting bracket. Pull the socket out of the mounting bracket.
(g) Unscrew the lamp and install the replacement.
(h) Insert the socket into the bracket and turn counterclockwise until the socket is firmly seated.

Dial Lamps

(i) Remove the Cover, Control Knobs and Front Panel. See Sections 2-1 and 2-2.
(j) Remove one of the clamps that secure the dial plate (the clamp closest to the lamp to be replaced).
(k) Pry out the lamp as you would a cartridge fuse. Push the replacement lamp into the clip.
(l) Replace the dial clamp and screw. Be careful not to exert pressure on the glass when replacing the clamp.

2-6. Switch and Control Replacement

(a) Remove the cover and bottom plate. See Section 2-1.
(b) Remove the Front Panel. See Section 2-2.
(c) Remove the MUTING Control or HI-BLEND switch by removing the hex nut that secures the control to the Front Panel Assembly.
(d) Remove the POWER switch by removing the two Phillips-head screws from the Front Panel Assembly. The microswitch can then be removed from the toggle bracket by removing two Phillips-head screws.
(e) Remove the MODE switch by removing the two Phillips-head screws from the front of the Front Panel Assembly.

2-7. Dial-Cord Stringing

Preparation: Remove the Front Panel Assembly. See Section 2-3.

(a) Cut a 59-inch (1,500 mm) length of dial cord.
(b) Rotate the tuning capacitor drive drum fully clockwise.
(c) Tie the cord to one end of the spring and hook the other end of the spring to the drive drum as shown in Fig. 2-6.

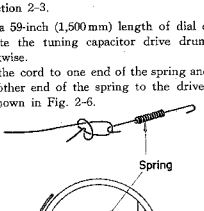


Fig. 2-6

(d) Run the dial cord through the slot in the rim of the drive drum and position the cord close to the rear edge of the drum.
(e) Run the cord over pulley A and then make two full counterclockwise turns around the tuning shaft. See Fig. 2-7.
(f) Run the cord around pulleys B, C, D, and E. See Fig. 2-8.

(g) Pull the dial cord taut and wrap 2-1/2 turns around the drive drum, starting at the rear edge. Pass the cord through the slot and attach the spring and eyelet as shown in Fig. 2-9.

(h) Tighten the cord, then squeeze the eyelet so that the spring is under tension.

(i) Put the dial pointer in place and run the dial cord over and under the tabs at the rear of the dial pointer.

(j) When dial cord stringing is completed and the tuning system checks out mechanically, put a drop of contact cement on the eyelet and at the place where the cord runs over the tabs of the dial pointer. See Section 3-4, Over-all Adjustments, for the method of accurately locating the dial pointer.

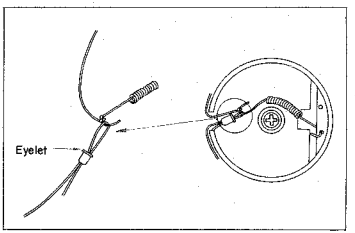


Fig. 2-9

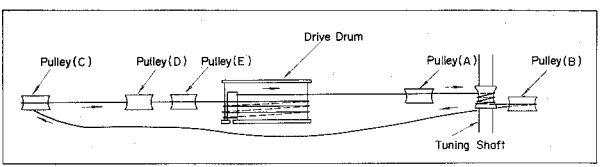


Fig. 2-7

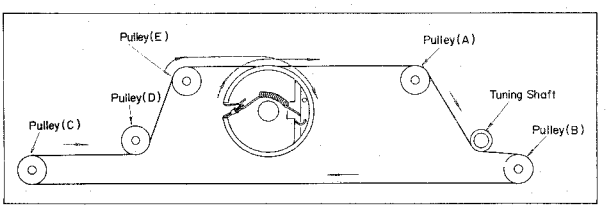
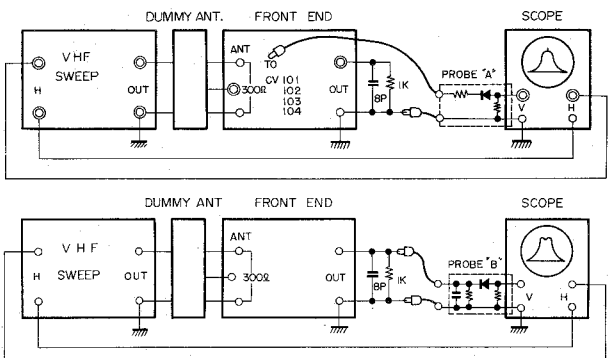


Fig. 2-8

Section 3
TEST AND ALIGNMENT

General. Follow the sequence of test and alignment procedures as given in the following text. Be sure each section checks out properly before proceeding to the next section.

Caution: Never attempt alignment unless a careful check of symptoms indicates that alignment is absolutely necessary. Factory adjustments are extremely stable and should not need to be reset except in unusual circumstances. Alignment need not be attempted when Front-End FET's have been replaced as changes in FET parameters have little effect upon tuning.



Front End Alignment Test Set-up

Fig. 3-1

3-1. Front End Alignment

A—Equipment Requirements

(1) VHF Sweep Generator
Center frequency —70 to 115 MHz (variable)
Sweep width 30 MHz (max) to 1 MHz (min.)
Output impedance —75 or 50 ohms
Maximum output level—90 dB/μ (0 dB/μ = 1μV)

(2) Marker Generator
Capable of generating accurate 86 and 109.5 MHz markers (crystal calibrated)

(3) Demodulator Probes
RF alignment probe—See Fig. 3-2 (a)
IF alignment probe —See Fig. 3-2 (b)

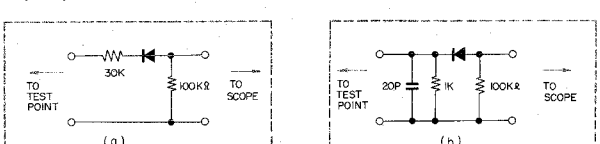
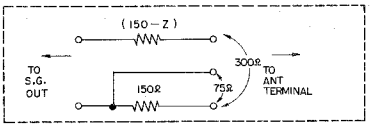


Fig. 3-2

(4) Oscilloscope
Vertical sensitivity —at least 5mV/cm
CRT diameter —5" or more
(5) Dummy Load —1 k with 20 pF in parallel
(6) Dummy Antenna —See Fig. 3-3
(7) Aligment Tools



Z = Nominal output impedance of S. S. G

Dummy Antenna
Fig. 3-3

B. Preparation

(1) Remove the shield cover from the Front End. Confirm that all Front End Mounting screws are tight.
(2) Remove the shield cover from the IF Section. Unsolder the IF input coaxial cable, and terminate the cable with the 1 k /20 pF dummy load.
(3) Loosen the set screw on the mechanical stopper mechanism at the front shaft of the tuning capacitor (To reset the stopper, refer to "Overall Adjustments, page 22).
(4) Loosen the lock nuts on the studs of the coils when it is necessary to adjust the inductors.

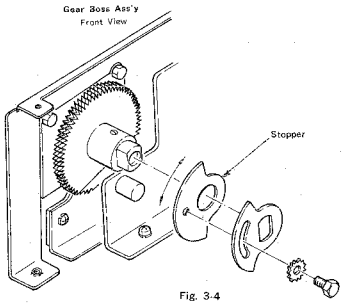


Fig. 3-4

C. Alignment Procedure

(Frequency Coverage and Tracking of RF Sections)

Adjusting Item	Sweep/Marker Connections	Scope Connections	Center and Marker Freq.	Adjustment	Tuning Capacitor Setting	Response
RF Stage Tuned Circuit (1)	Antenna terminals through dummy antenna Sweep width-1 MHz Sweep output 50 to 60dB/μ	CV 101 hot lead (stator) and ground through demodulator probe (A)	86 MHz 109.5 MHz	Antenna input L 101	MAX capacitance	marker Adjust to obtain max and symmetric response.
				CT 101	MIN capacitance	
RF Stage Tuned Circuit (2)	same as above	CV 102 hot lead (stator) and ground through demodulator probe (A)	86 MHz 109.5 MHz	L 102*	MAX capacitance	marker Adjust to obtain max and symmetric response.
				CT 102	MIN capacitance	
				*shunt L 103 with 0.01 μF capacitor		
RF Stage Tuned Circuit (3)	same as above	CV 103 hot lead (stator) and ground through demodulator probe (A)	86 MHz 109.5 MHz	L 103*	MAX capacitance	Adjust to obtain max. and symmetric response.
				CT 103	MIN capacitance	
				*shunt L 104 with 0.01 μF capacitor		
RF Stage Tuned Circuit (4)	same as above	CV 104 hot lead (stator) and ground through demodulator probe (A)	86 MHz 109.5 MHz	L 104	MAX capacitance	Adjust to obtain max. and symmetric response.
				CT 104	MIN capacitance	
Mixer Stage	Antenna terminals through dummy antenna Sweep width-1 MHz Sweep output 30~40 dB/μ	Dummy load through demodulator probe (B)	Center Freq. 86 MHz Marker 10.7 MHz	IFT 101	MAX capacitance	marker
				IFT 102	Same as above	
Local Oscillator	Same as above	Same as above	86 MHz 109.5 MHz	L 106	MAX capacitance	Adjust to obtain max. and symmetric response.
				CT 105	MIN capacitance	

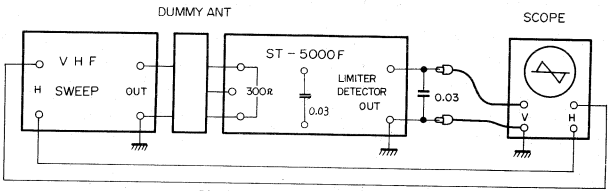
Note: Demodulator capacitance has some detuning effect, therefore touch up the previous adjustments at each step. For example, touch up L 101, CT 101 when making L 102, CT 102 adjustments, etc. Repeat the foregoing steps as needed.

3-2. Discriminator Adjustment

A—Equipment Requirments

(1) VHF Sweep Generator
Center frequency —8 to 12 MHz (variable)
Sweep width —1 MHz or more (variable)
Output impedance —75 or 50 ohms

(2) Oscilloscope
Vertical Sensitivity —at least 5 mV/cm
CRT diameter —5" or more



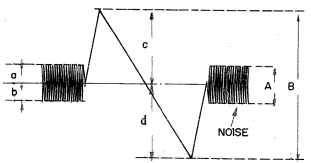
Discriminator Adjustment Test Set-up

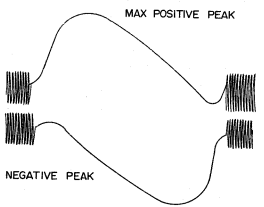
Fig. 3-5

(3) Ceramic capacitors—0.02 μF×2 or 0.03 μF×2
(4) Dummy Antenna —See Fig. 3-2
(5) Alignment tools

B. Preparation

(1) Remove the shield cover from the Limiter-detector Board.
(2) Connect 0.02 μF ceramic capacitor across input and output terminals of the Limiter-detector Board.
(3) Set the Sweep Generator output 0 dB/μ.





C. Discriminator Alignment

(1) Connect the test equipment as shown in Fig. 3-5.
(2) Adjust scope controls to provide a visible indication.
(3) Adjust IFT 301 top and bottom cores to obtain the "S" response curve shown at waveform A.
(4) Turn the top core of IFT 301 to equalize the noise components above and below the trace (make a and b equal), as shown at waveform A.
(5) Turn the bottom core of IFT 301 to obtain maximum response.
(6) Detune the top core in both directions to obtain maximum positive and negative output as shown at waveform B. Adjust R 319 (DC Balance) to obtain equal response when the core is peaked to provide either maximum negative or positive output as shown.
(7) Reset the top core of IFT 301 to equalize negative and positive peaks, as shown in waveform A (c=d=1/2B).
(8) Check to make sure that the S curve does not change when the shunting capacitor is removed from the input to the Limiter-detector Board.
(9) Disconnect the sweep generator and make sure that the scope displays only noise. Adjust IFT 301 top core to make the Tuning Meter indicate the null point (center scale).

3-3. Multiplex Section Checkout and Adjustment

Caution: Do not make adjustments in the MPX section unless they are absolutely necessary. Factory adjustments are very precise and stable, and usually do not require readjustment in the field.

A—Equipment Requirements

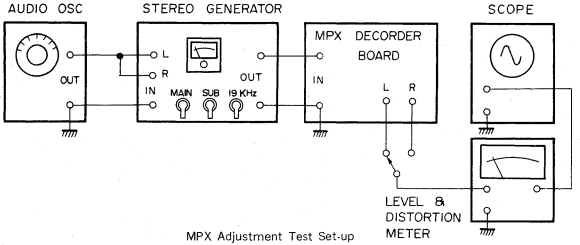
(1) Multiplex Stereo Generator —Capable of using a 50 kHz signal with low distortion
(2) Audio Generator —Low harmonic distortion
(3) Distortion Meter
Note: Overall harmonic distortion of all test equipment should be less than 0.1%.
(4) AC VTVM —Capable of indicating rms voltages of 0.01V or less
(5) Alignment Tools
(6) Radio-Service Type Cement Solvent

B. Preparation

(1) Check DC operating voltages for all stages to make sure that each stage is operating normally.
(2) Calibrate the 67 kHz output of the AUDIO oscillator with a counter.
(3) Set up Standard Composite signal as follows.

Main channel level	400 Hz, −22 dB
Pilot signal level	19 kHz, −35 dB
Sub channel level	38 kHz, −22 dB

(4) Please refer to the Fig. 3-7 for your convenience.



MPX Adjustment Test Set-up

Fig. 3-6

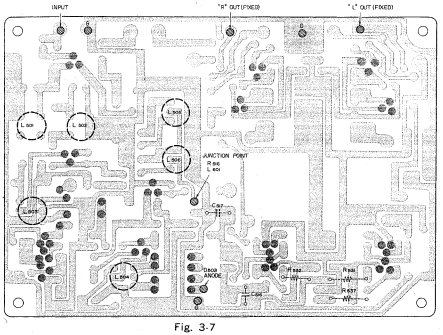
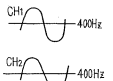
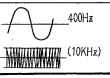


Fig. 3-7

C. Procedure

Adjusting Item	MPX Generator Connections	Scope or VTVM Connections	Adjustment	Remarks	Response
19 and 38 kHz tuned circuits	MPX Input terminal 19 kHz, −35 dB	D 503 anode and ground	L 501, 502, 503, 504	Tune for maximum reading	
19 kHz Trap	same as above	Junction of R 516 and L 506 and ground	L 506	Tune for minimum reading	
67 kHz Trap	same as above 67 kHz, −35 dB (freq. must be accurate)	same as above	L 506	Tune for minimum reading	
Output Level Adj.	MPX Input Terminal Standard output level, Modulation: "Left" and "Right"	Left and right output terminals to coincide with generator	R 531 532	Adjust to reduce the difference between L and R channels less than 0.5 dB	
De-emphasis Adj.	Same as above	Same as above	C 516 C 517	Record output of each channel at 400Hz. Change modulation frequency to 10 kHz and set C 516/517 to obtain a reading that is down 13.7±0.5 dB.	

MPX Decoder Adj.

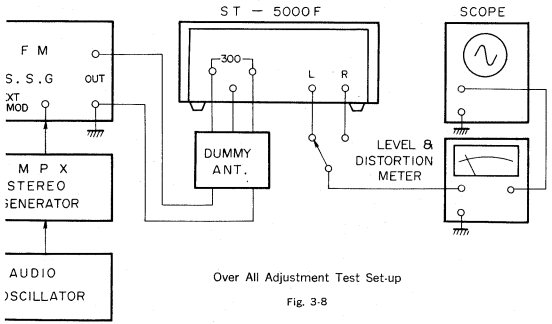
Item to be Checked	MPX Generator Connections	Scope or VTVM Connections	Adjustment	Remarks	Response
Distortion	MPX input-terminal Standard composite signal	L and R output terminal to coincide with generator settings	—	Check to see that harmonic distortion is less than 0.3% for each channel.	
Separation	same as above	same as above	R 537	Record output of L channel. Turn Generator to R output and record residual level. Adjust R 537 to reduce the residual level to at least 45dB below the normal reading. Check both channels in this manner.	

ver-all Adjustment

touch-up adjustments ensure optimum per-
. They also assist in localizing troubles.

pment Requirements

ard FM Signal Generator
Stereo Signal Generator
Oscillator
(4) Distortion Meter with AC VTVM
(5) Dummy antenna
(6) Oscilloscope
(7) Alignment Tools
(8) Cement solvent (Radio Service Type)



Over All Adjustment Test Set-up

Fig. 3-8

aural Distortion

ect the equipment as shown in Fig. 3-8.
M Signal Generator frequency to 98 MHz,
, 100% modulation. Output level 60dB/μ.
IFT 102 (early model only) slightly for
ium distortion.
ge modulating frequency to 7 kHz.
distortion, if more than 1.0%, tune the
of IFT 101, (102), for minimum distortion.
his adjustment has a great effect upon
ner sensitivity. Do not turn the core
ore than 1/2 turn in either direction.
heck sensitivity after the core of IFT 101,
102) has been reset.

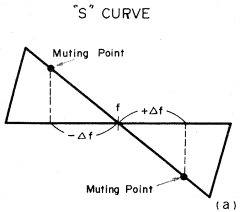
C. Muting Circuit Adjustment

ST-5000FW employs some complicated muting circuits as mentioned in "Circuit Description." That is, following three functions are combined:

(1) Muting control according to the input field strength.
(2) Muting for detuning condition.
(3) Muting for interstation noises.

Adjustment Procedures:

(1) Muting Level Control Check
(a) With the equipment connected as shown in Fig. 3-8 set the FM signal generator as follows:
98 MHz 400 Hz modulation 100%, output Level 15±3 dB/u.
(b) Turn the muting level control knob clockwise to the full.
(c) Tune the set and confirm that the output is muted when muting level control knob turned counterclockwise to its minimum.
If the muting circuit does not operate properly, check the related circuitry.



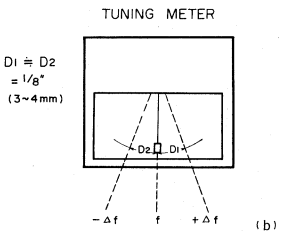


Fig. 3-9

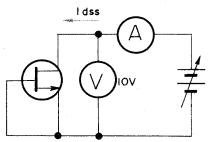


Fig. 3-10

(2) Muting Level Calibration at Detuning Condition

Readjustment is necessary after replacing X 401 (FET) or if the tuning meter deflection is unbalanced when detuning $+\triangle f$, $-\triangle f$ respectively. The relations among "S" curve, muting level and tuning meter deflection are shown in Fig. 3-9.

(a) Set the FM Signal Generator as follows: 98 MHz 400 Hz 100% Modulation, Output Level 60 dB/μ.
(b) Set the muting control knob "ON" and its minimum position.
(c) Tune the set and shift the tuning frequency higher and lower by turning this tuning knob until the muting circuit begins to operate and note the deflection of tuning meter. Deflection of the tuning meter should be approx. 1/8" (3-4 mm) off position from the tuning meter's center point where the muting circuit begins to operate.
In case of difference between D1 and D2 is too much, follow the next procedures.
(d) In case of D1≫D2
Increase the value of R 403 and R 407 respectively to obtain proper response on the tuning meter.
(e) In case of D1≪D2
Decrease the value of R 403 and R 408 respectively to obtain the proper response on the tuning meter.
(f) If the foregoing procedures do not make any sense, check the FET (X 401)'s Idss and replace if necessary. Defective FET does not have Idss of 6 mA or more. Idss can be checked by the circuit as shown Fig. 3-10.

D. Tuner Input Meter Calibration

(1) Connect signal generator to antenna input terminals using dummy antenna. Set generator to 98 MHz, 400 Hz 100% Modulation, Output Level 60 dB/μ.
(2) Tune the set to 98 MHz. Adjust VR 241 (Meter Calibration Adj.) to get a meter reading of 0.08" (2 mm) to the left of maximum on the meter scale.

E. Dial Pointer and Tuning Stopper Adjustments

(1) Connect the signal generator to the antenna terminals through the dummy antenna.
(2) Set the generator to 98 MHz (crystal calibrated) 400 Hz 100% Modulation, RF Output 20 dB/μ.
(3) Set the MUTING switch to OFF.
(4) Tune the set precisely to the 98 MHz signal.
(5) Set the pointer to 98 MHz on the dial.
(6) Remove the top shield from the Front End.

(7) Adjust the Mec
pointer does not
left of the 87 MH
on the stopper
long-nosed pliers.
(8) Replace the shiel
ing screws.

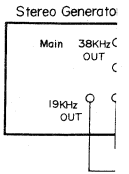
F. Monaural Freq Adjustment

(1) Connect the FM
dummy antenna
98 MHz, 400 Hz
Output level 60
(2) Check outputs
terminals with g
tively. If output
another, set R 54
(3) Check to see tha
more than 1 dB
dulating frequen
15 kHz. If the
reset C 516 and

G. Multiplex Decc

(1) Connect equipme
the signal genera
98 MHz, RF out
Modulation
Main channel (L

Sub channel (38
Pilot Signal (19 k
(2) Connect the MP
scope as shown
(3) Adjust the outp
signal to obtain
shown in Fig. 3-



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the tuning
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t make any
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lss can be
Fig. 3-10.
a input ter-
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ion, Output
241 (Meter
ng of 0.08"
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na.
al calibrated)
ut 20 dB/μ.
Hz signal.
dial.
ont End.

(7) Adjust the Mechanical Stopper so that the pointer does not move more than 1/8" to the left of the 87 MHz mark. The hex-head screw on the stopper can be turned with a pair of long-nosed pliers.
(8) Replace the shield cover and tighten the mounting screws.

F. Monaural Frequency Response Check and Adjustment

(1) Connect the FM Signal Generator through a dummy antenna and set the generator as follows: 98 MHz, 400 Hz modulation 100%, (75 kHz), Output level 60 dB/μ.
(2) Check outputs at the L and R Fixed-output terminals with generator set to L and R respectively. If outputs are not within 0.5 dB of one another, set R 547 and R 548 to equalize outputs.
(3) Check to see that output level does not change more than 1 dB in either channel as the modulating frequency is changed from 10 kHz to 15 kHz. If the change is greater than 1 dB, reset C 516 and C 517 to correct the condition.

G. Multiplex Decoder Check and Adjustment

(1) Connect equipment as shown in Fig. 3-8. Set the signal generator as follows:
98 MHz, RF output 60 dB/μ
Modulation
Main channel (L or R 400 Hz) 45%, 33.75 kHz deviation
Sub channel (38 kHz) 45%, 33.75 kHz deviation
Pilot Signal (19 kHz) 10%, 7.5 kHz deviation
(2) Connect the MPX Stereo Generator and oscilloscope as shown in Fig. 3-11.
(3) Adjust the output phase of the 19 kHz pilot signal to obtain the stable Lissajous pattern shown in Fig. 3-12.

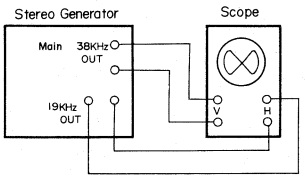


Fig. 3-11

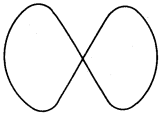
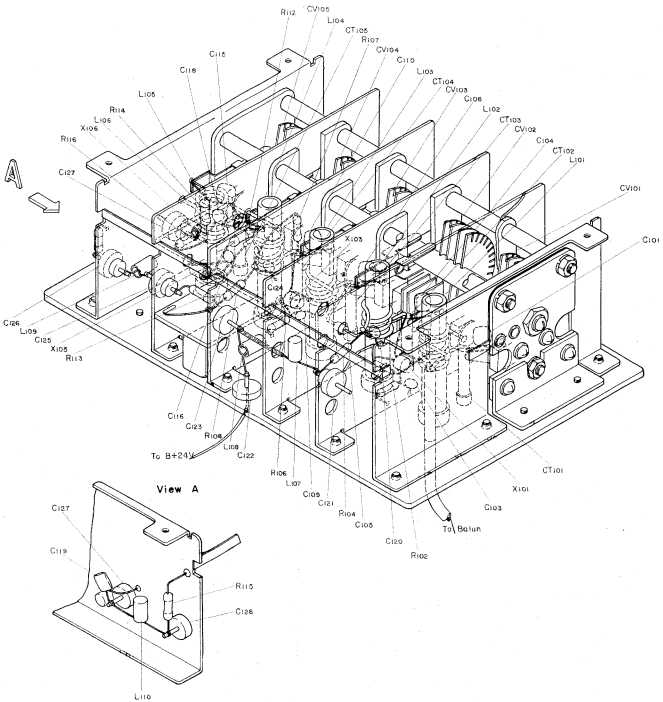


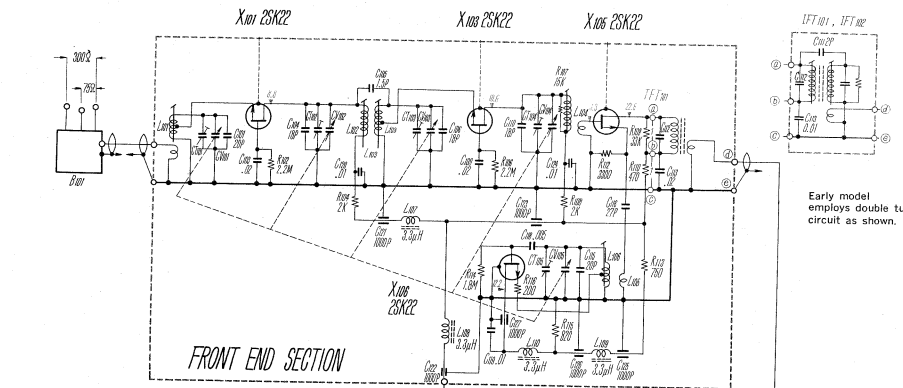
Fig. 3-12

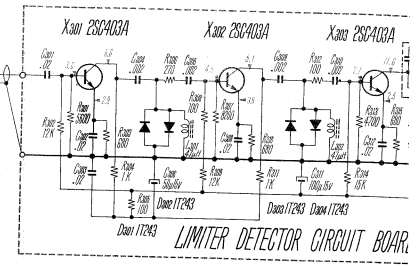
(4) Soften the cement at the base of the 38 kHz switching transformer (L 504) and lift off the shield gently if an adjustment is needed to correct distortion (see Step 6 below).
(5) Remove the paint from the variable potentiometer R 537 if channel separation is to be reset. (see Step 7 below).
(6) Connect the Distortion Meter to the L and R fixed-output terminals to coincide with L and R settings on the signal generator.
(7) Check distortion in each channel. If distortion is more than 0.8%, adjust L 504. Recheck distortion with a modulation frequency of 10 kHz. Reset L 504 if necessary.
(8) Check channel separation as follows. Record output at the left channel. Switch the generator to R and check residual signal in the left channel. The signal-to-residual ratio represents the separation. It should be at least 35 dB. If not reset R 537 to make it so.

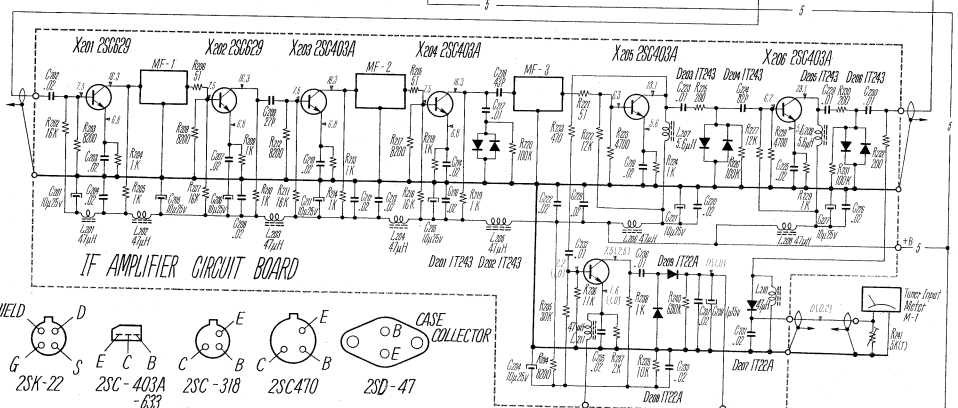
Mounting Diagram
—Front End Section—

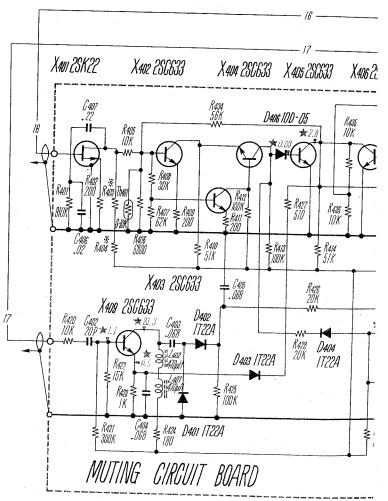


Schematic Diagram







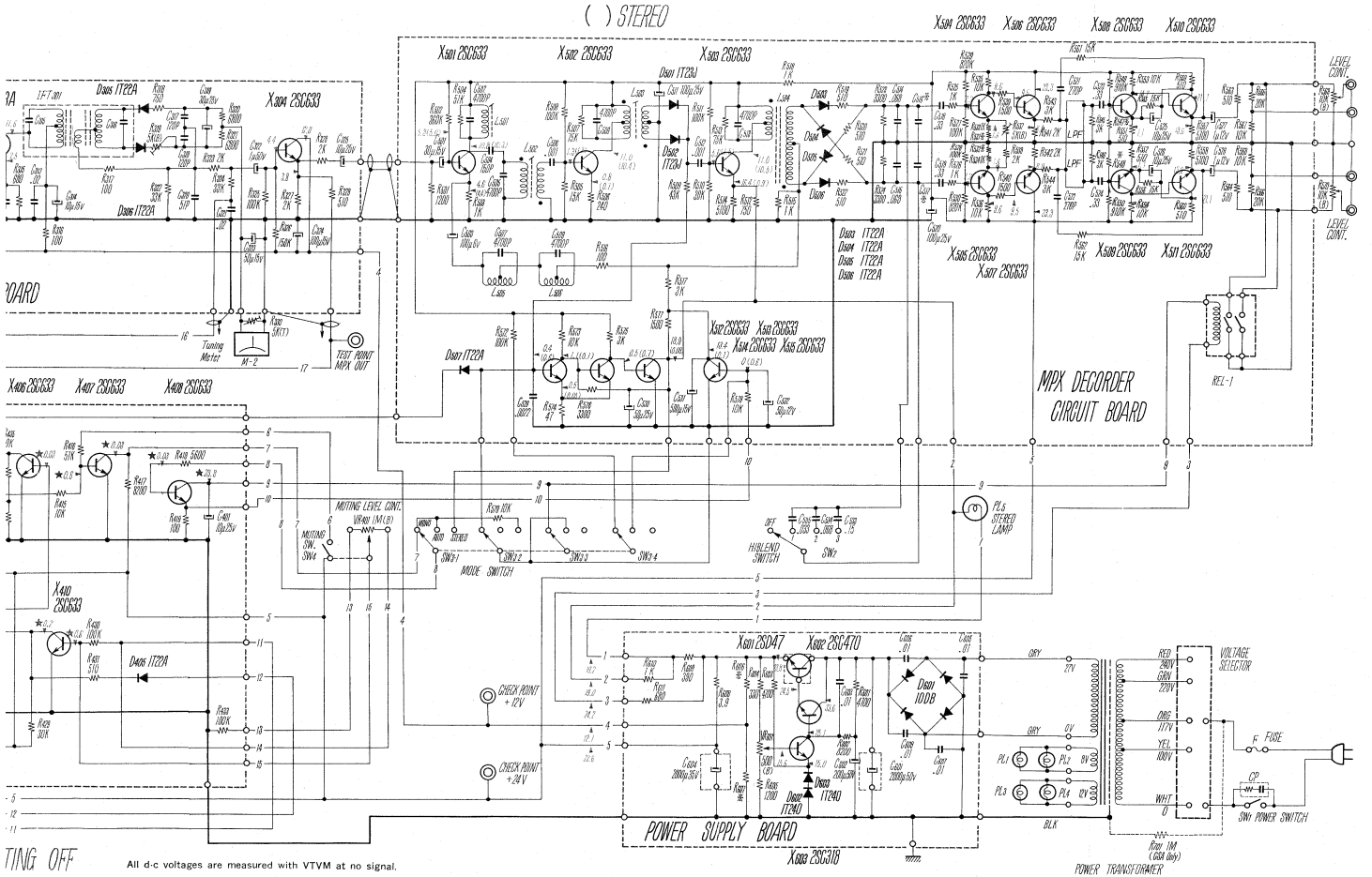


X207 2SC403A

( ) TUNE

* : To be selected
In early model, R_{402} is 100 ohms and R_{407} is 100 K ohms.

★ MUTING

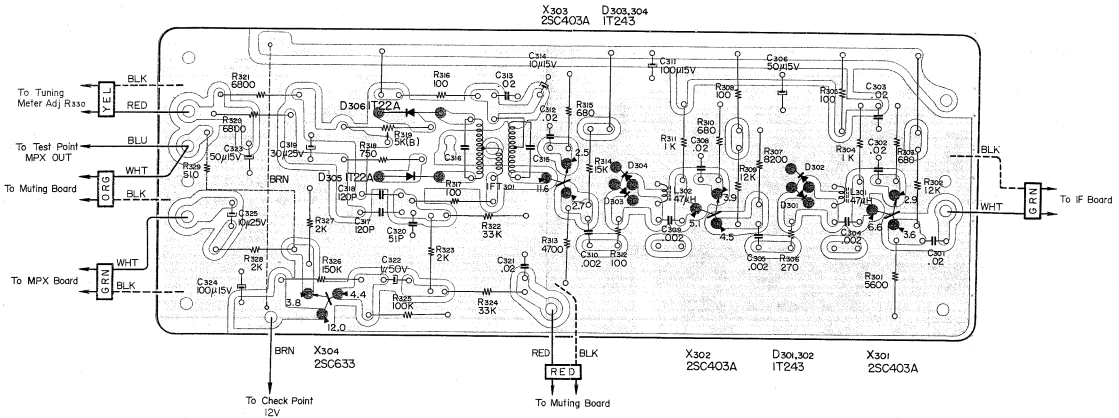


All d-c voltages are measured with VTVM at no signal.

Mounting Diagram

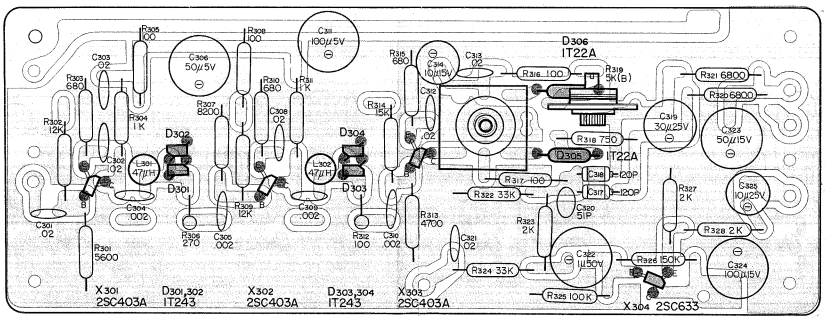
Limiter and Detector Section

Conductor Side



R329 is mounted on conductor side.

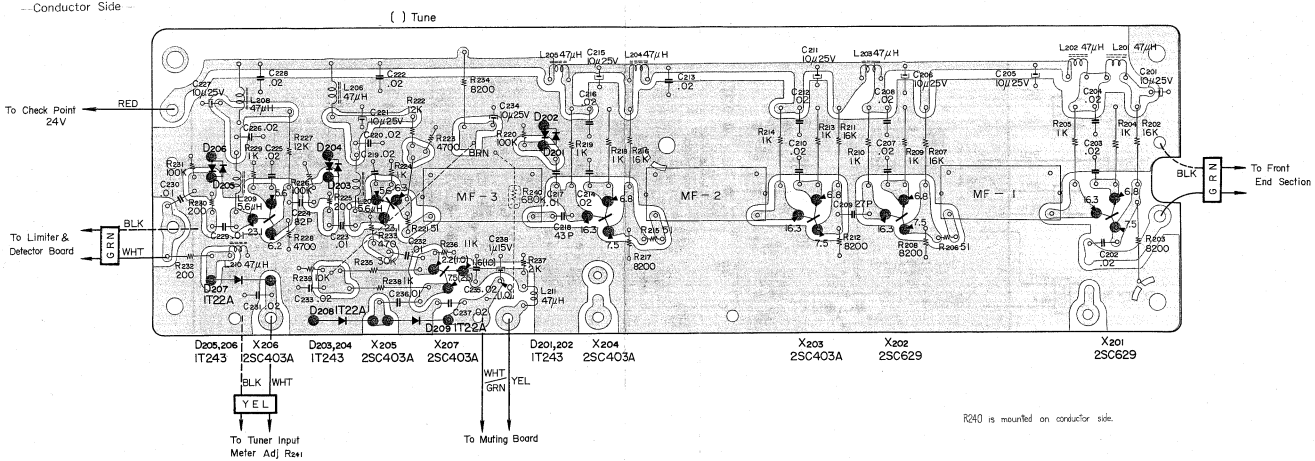
Component Side



Mounting Diagram

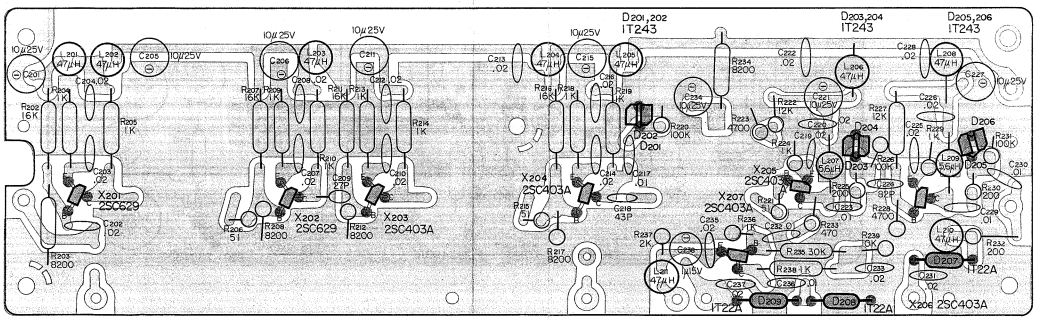
IF—Section

Conductor Side



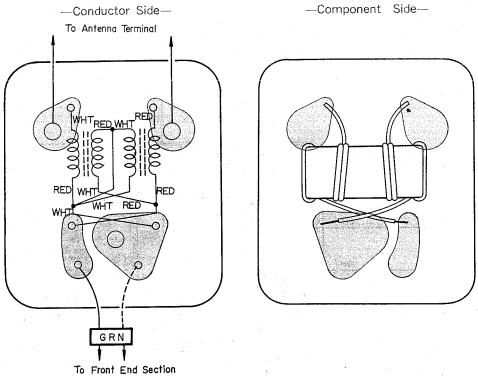
R240 is mounted on conductor side.

Component Side

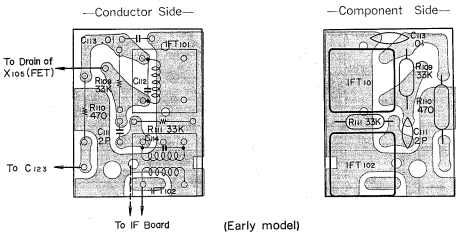


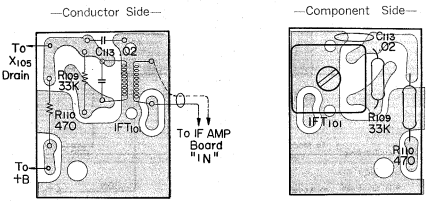
Mounting Diagram

Balun Section



RF Mixer (convertor) Section (Front End)

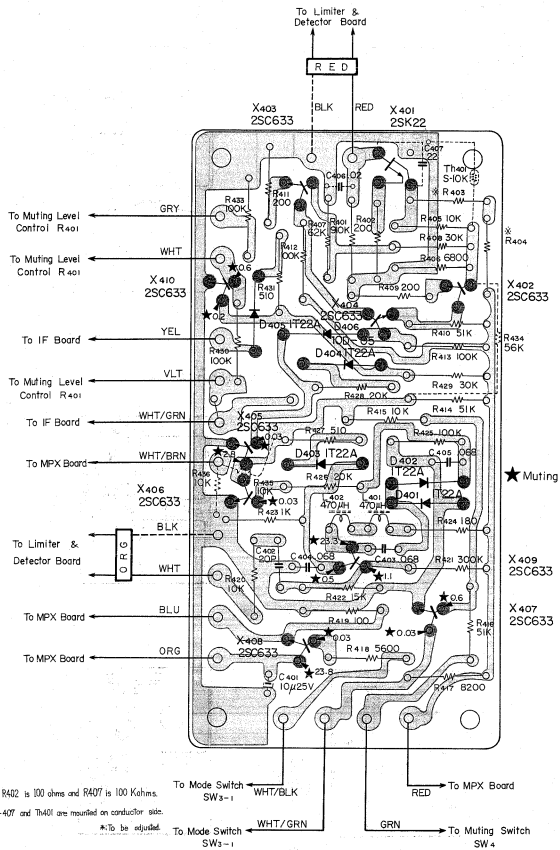




Mounting Diagram

Muting Circuit Board Section

—Conductor Side—



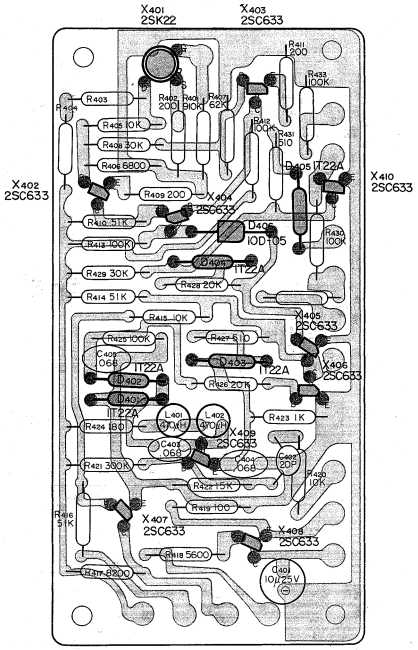
In early model, R402 is 100 ohms and R407 is 100 Kohms.

R434-436, C406-407 and Th401 are mounted on conductor side.

*To be adjusted.

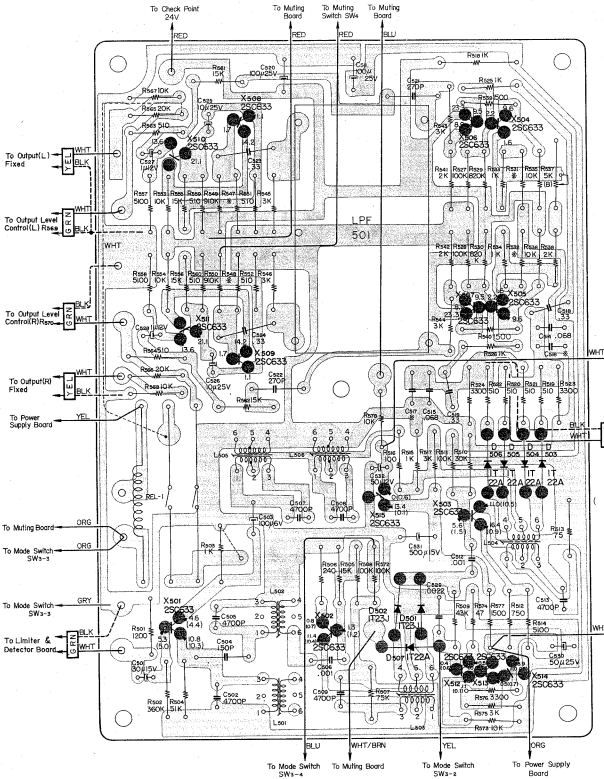
Mounting Diagram

Muting Circuit Board Section
—Component Side—



Mounting Diagram

MPX Decoder Section
Conductor Side

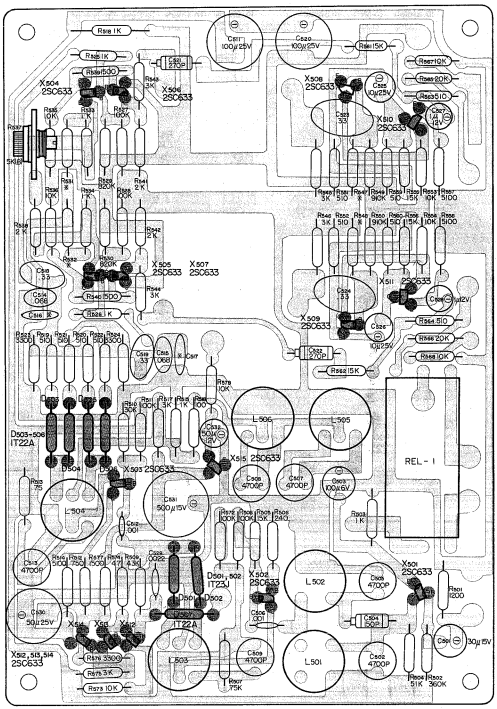


*: To be adjusted.

Mounting Diagram

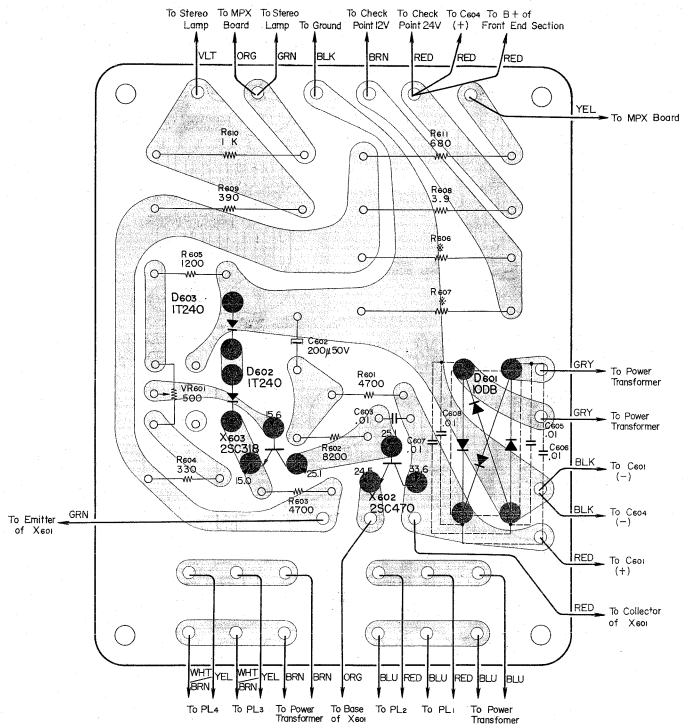
MPX Decoder Section

—Component Side—



Mounting Diagram
Power Supply Section

Conductor Side

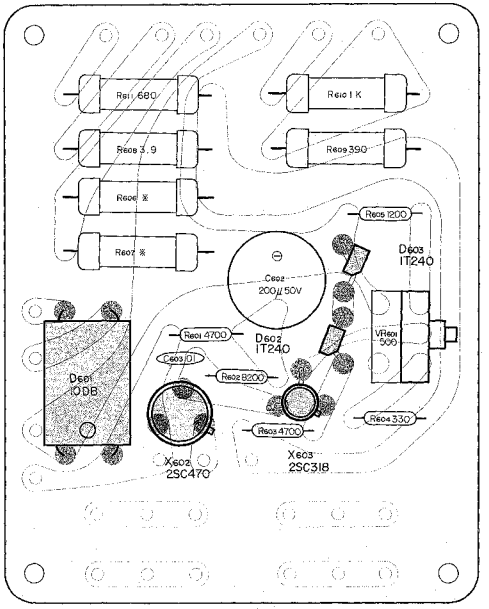


C605-608 are mounted on conductor side.
※: To be adjusted.

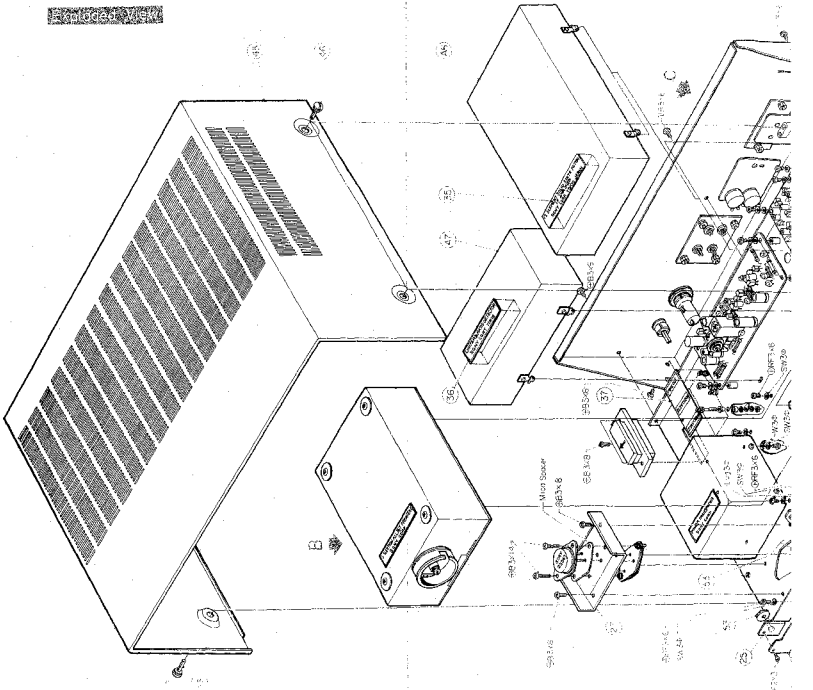
Mounting Diagram

Power Supply Section

(Component Side)



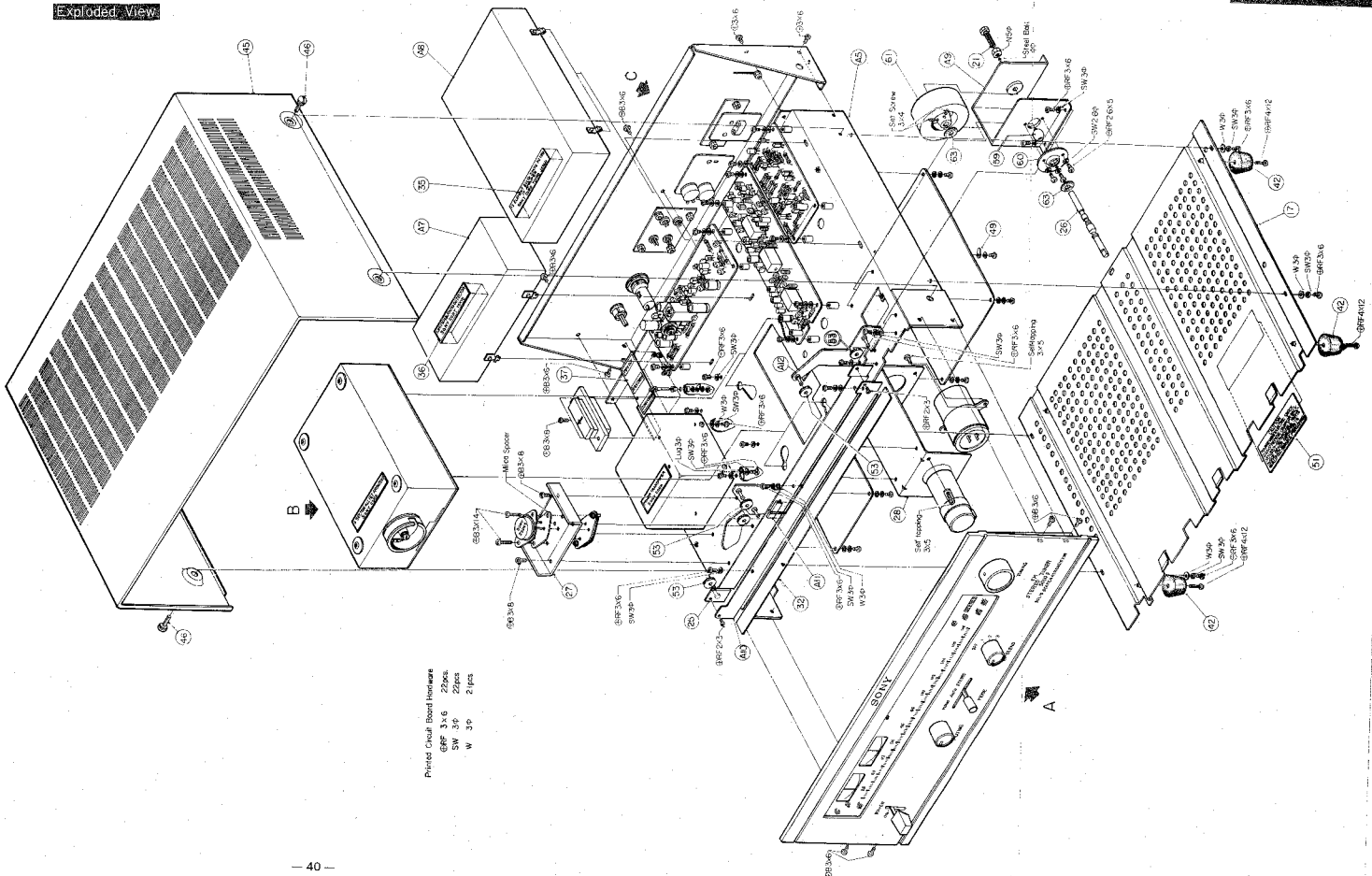
Exploded View



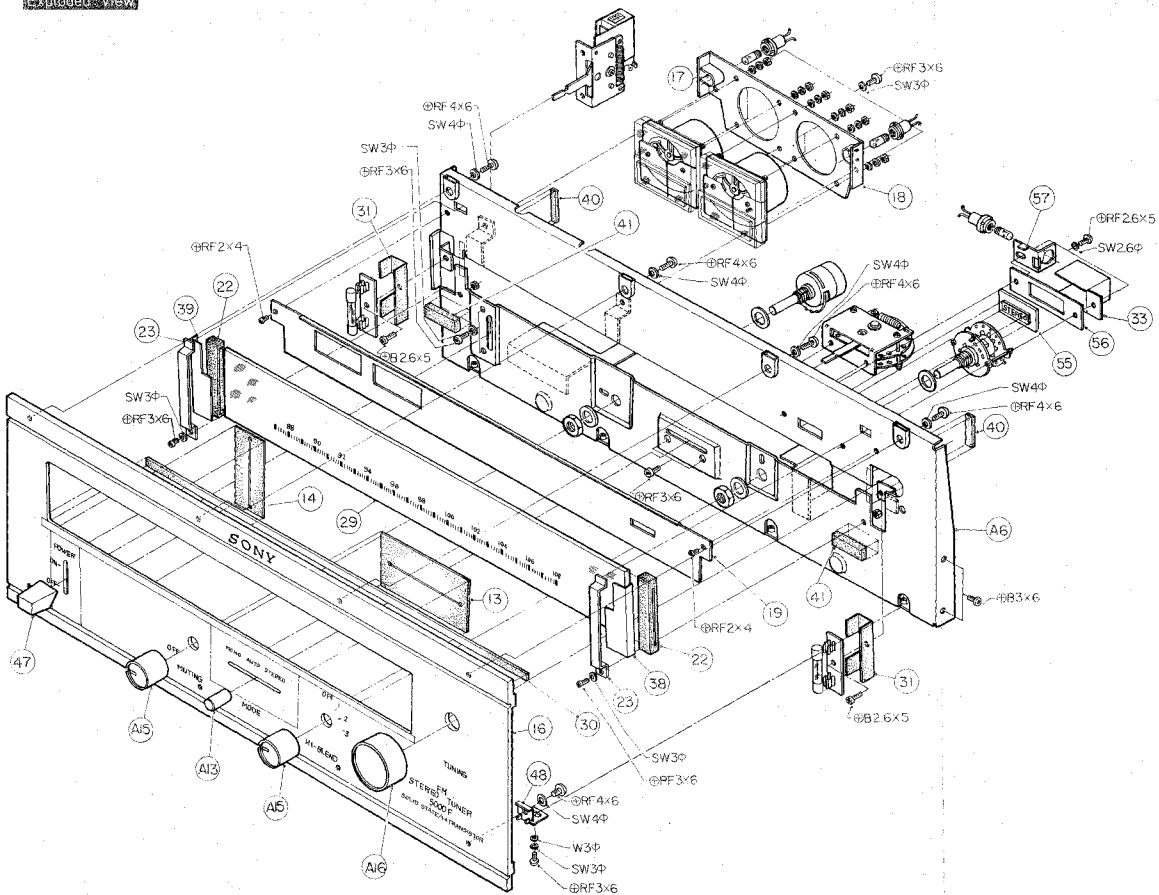
Printed Circuit Board Hardware

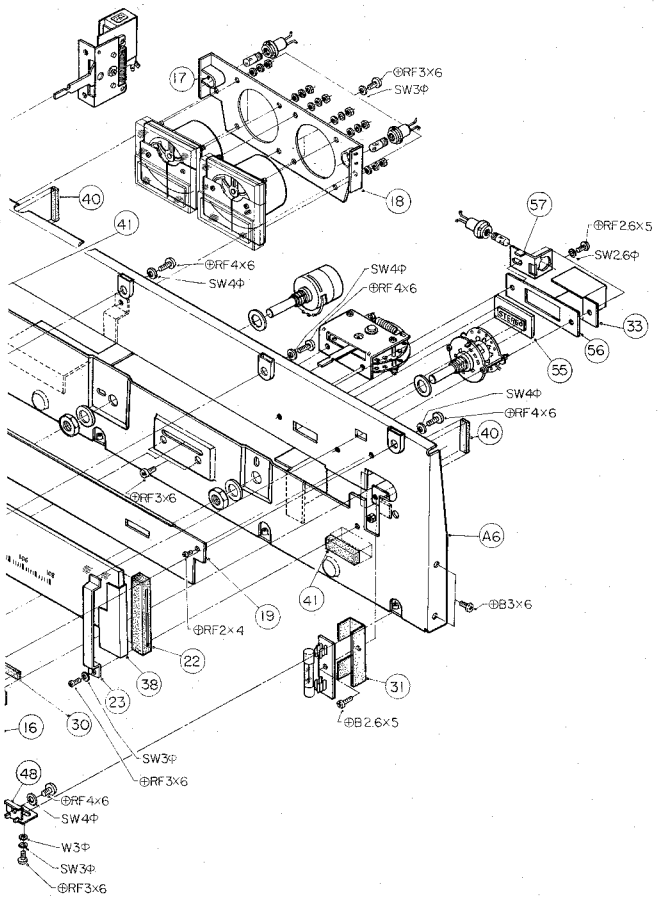
BBF	3 x 6	22pcs
SW	3 ϕ	22pcs
W	3 ϕ	21pcs

Exploded View

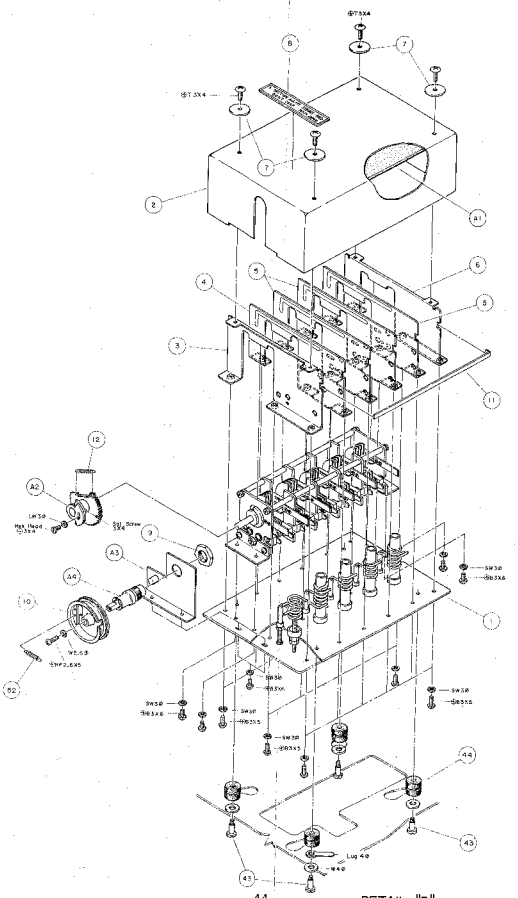


Exploded View





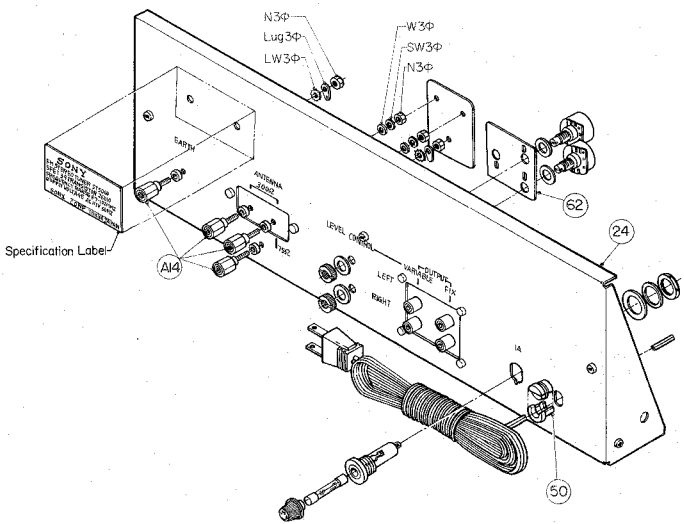
Exploded View



DETAIL "B"

Exploded View

DETAIL "C"



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Revised

Complete Spare Parts List for ST-5000FW (UL, CSA, E)

July 30, 1968

Ref. No.	Part No.	Description	Q'ty
I. Mechanical Parts			
	i) Front End Section		
A1	X-38518-01	Foil Ass'y, copper	1
A2	X-38512-01	Boss Ass'y, gear	1
A3	-02	Stopper Ass'y	1
A4	-03	Shaft Ass'y, drum	1
1	3-851-801	Chassis, front end	1
2	-802	Case, shield	1
3	-803	Plate A, shield	1
4	-804	Plate B, shield	1
5	-805	Plate C, shield	3
6	-806	Plate D, shield	1
7	-809	Washer, large	4
8	-810	Label, front end	1
9	-219	Nut	1
10	-220	Drum	1
11	-222	Bar, short	1
12	0-029-624	Spring, gear	1
	ii) Main Chassis		
A5	X-20472-01	Chassis Ass'y	1
A6	-02	Sub-panel Ass'y	1
A7	-03	Case Ass'y, shield; limiter & detector	1
A8	-04	Case Ass'y, shield; IF section	1
A9	-05	Bracket Ass'y, flywheel	1
A10	-06	Guide Ass'y, pointer	1
A11	-07	Pointer Ass'y	1
A12	-08	Plate Ass'y, pulley	1
A13	-09	Knob Ass'y, mode selector	1
A14	X-20319-01	Terminal Ass'y, output	4
A15	X-20320-03	Knob Ass'y, muting & hi-blend	2
A16	X-38240-07	Knob Ass'y, tuning	1
13	2-047-106	Cushion A, light interception	1
14	-107	Cushion B, light interception	1
15	-211	Rivet	6
16	-226	Panel, front	1

Ref. No.	Part No.	Description	Q'ty
17	2-047-227	Plate, bottom	1
18	-228	Bracket, meter	1
19	-229	Plate, dial back ; upper	1
20	-230	Plate, antenna terminal; black	1
22	-232	Cushion, dial plate	2
23	-233	Holder, dial plate	2
24	-234	Panel, rear	1
25	-235	Plate, dial back; lower	1
26	-236	Shaft, tuning	1
27	-237	Heat Sink, 2SD47	1
28	-238	Bracket, electrolytic capacitor	1
29	-239	Plate, dial	1
30	-240	Cushion, rubber	1
31	-241	Insulator, pilot lamp	2
32	-242	Spacer, dial plate	1
33	-243	Cover, stereo lamp	1
34	-244	Label, specification (UL)	1
35	-245	√Label, IF amplifier	1
36	-246	Label, limiter & detector	1
37	-248	Label, test point	1
38	-249	Spacer, dial plate (right)	1
39	-250	Spacer, dial plate (left)	1
41	-252	Rubber, black	2
	-258	Screw, adjustable	1
42	0-051-263	Foot, rubber	4
43	0-204-214	Screw, front end	4
44	-220	Cushion, front end	4
45	2-029-921	Cover, chassis	1
46	-930	Screw, chassis cover	4
47	-931	Knob, power ON/OFF switch	1
48	2-043-776	Bracket, front panel	4
49	3-401-179	Lug, wire retaining	2
50	3-410-032	Grommet, power cord	1
51	3-422-204	Label, caution	1
52	3-802-520	Spring, dial drum	1
53	3-811-140	Pulley, small	5
54	-819	Label, FCC	1
55	3-824-019	Indicator, stereo	1
56	-033	Retainer, stereo indicator	1
57	-034	Bracket, stereo lamp	1
58	-036	Filter, meter lamp	2
59	-039	Holder, tuning shaft	1
60	-040	Disc, tuning shaft holder	1

Ref. No.	Part No.	Description	Q'ty
61	3-824-041	Flywheel	1
62	-046	Plate, adjustable resistor	1
63	3-409-124	Washer, nylon	2
	7-633-120-32	String, dial	1,500mm

II. Accessories & Packing Materials

1-501-083	Antenna, ribbon	1
1-532-218	Fuse, UL	1
1-534-049	Cord, connection RK-56	1
3-413-100	Bag, polyethylene; complete set	1
3-701-020	Bag, polyethylene; manual, etc.	1
-026	Label, tack	1
3-790-768-32	Manual, instruction	1
3-994-399	Card, warranty	1
4-404-717	Card, inspection	1
X-44900-02	Cloth, polishing	1
7-491-001	Desiccant	1
2-029-944	Cushion, packing	2
3-824-055	Carton	1
3-824-060	Box, accessory	1
-061	Carton, master (for two sets)	½

III. Screws, Washers & Nuts

i) Front End Section

7-621-259-32	Screw, machine (+) RF 2.6 x 5	1
-461-28	" , " (+) T 3 x 4	4
-770-43	" , " (+) B 3 x 6	6
-53	" , " (+) B 3 x 5	18
-713-22	" , setting 3 x 4	1
-999-72	" , hexagonal 3 x 4	4
7-623-107-25	Washer, plain 2.6ø	1
-208-15	" , spring 3ø	24
-408-05	" , lock 3ø	1
-508-01	Lug 3ø	1

ii) Main Chassis

7-621-255-19	Screw, machine (+) RF 2 x 3	4
-259-32	" , " (+) RF 2.6 x 5	5

Ref. No.	Part No.	Description	Q'ty
	7-621-261-43	Screw, machine (+) RF 3 x 6	58
	-268-42	" , " (+) RF 4 x 6	8
	-268-73	" , " (+) RF 4 x 12	4
	-713-27	" , setting 3 x 4	2
	-722-31	" , self-tapping 3 x 5	4
	-770-26	" , machine (+) B 3 x 6	5
	-39	" , " (+) B 3 x 8	6
	-43	" , " (+) B 3 x 6	4
	-773-68	" , " (+) B 3 x 14	2
	-771-33	" , " (+) B 2.6 x 5	2
	7-622-108-02	Nut 3ϕ	4
	-312-02	" 5ϕ	1
	7-623-108-13	Washer, plain 3ϕ	16
	-110-13	" , " 4ϕ	4
	-207-15	" , spring 2.6ϕ	5
	-208-15	" , " 3ϕ	60
	-210-15	" , " 4ϕ	8
	-408-01	" , lock 3ϕ	2
	-508-01	Lug 3ϕ	3
	-510-01	" 4ϕ	1
	-611-00	Eyelet 1.5 x 3	1
	7-671-114-01	Steel Ball 4ϕ	1

IV. Electrical Parts

1) Front End Section

Y-20472-51	Front End, completed (FMC-105W1)	1
	Mounted Circuit Board, IFT	1
1-538-770	Printed Circuit Board, IFT	1
	Field Effect Transistor 2SK22DF X101,103,105,106	4
1-141-067	Capacitor, trimmer; cylinder CT101 - 105	5
1-102-019	Capacitor, feed through C120 - 127	8
1-151-164	Capacitor, tuning; 5 gang CV101 - 105	1
1-401-332	Coil, antenna L101	1
1-403-282	Transformer, IF IFT101	1
-286	" , IF IFT102	1
1-405-329	Coil, oscillator L106	1
1-407-184	Inductor, micro 3.3uF L107 - 110	4
1-425-397	Coil (1), RF L102	1

Ref. No.	Part No.	Description				Q'ty
	1-425-398	Coil (2), RF			L103 ----------	1
	-399	" (3), RF			L104 ----------	1
	-400	", mixer			L105 ----------	1
		Capacitor, ceramic				
	1-101-952	2PF	±0.5PF	25V	C111 ---------	1
	-869	27P	±5%	"	C116 ---------	1
	-140	0.005uF	(+80% -20%	"	C118 ---------	1
	-141	0.01uF	"	"	C113 ---------	1
	-972	18PF	±5%		C104,106,110 -	3
	1-102-861	20PF	"		C115 ---------	1
	1-101-938	1.5PF	±10%	500V	C105 ---------	1
	-142	0.02uF		25V	C103,109 -----	2
	-973	20PF			C101 ---------	1
		Capacitor, mylar				
	1-105-673	0.01uF	±10%	50V	C119 ---------	1
		Resistor, carbon				
	1-244-653	150 ohms	±5%	RD¼SR	R105 ---------	1
	-665	470 "	"	"	R110 ---------	1
	-670	750 "	"	""	R113 ---------	1
	-671	820 "	"	"	R115 ---------	1
	-680	2K "	"	"	R104,108 -----	2
	-685	3.3K "	"	"	R112 ---------	1
	-709	33K "	"	"	R109,111 -----	2
	-751	1.8M "	"	"	R114 ---------	1
	-753	2.2M "	"	"	R102,106 -----	2

ii) IF Section

	Mounted Circuit Board, IF circuit ------	1
1-538-772	Printed Circuit Board, IF circuit ------	1
1-403-293	Filter, solid state MF-1,2,3 --------	3
1-407-165	Inductor, micro 47uH L201 - 206, 208, 210,211 --------	9
-187	" " 5.6uH L207,209 --------	2
	Transistor 2SC403A X203 - 207 ------	5
	" 2SC629 X201,202 --------	2

Ref. No.	Part No.	Description			Q'ty
		Diode 1T22AJ		D207 - 209 ----	3
		" 1T243		D201 - 206 ----	6
		Capacitor, ceramic			
	1-101-869	27PF ±5%	50V	C209 ----------	1
	-878	43PF "	"	C218 ----------	1
	-892	82PF "	"	C224 ----------	1
	-141	0.01uF (+100% -0%		C217,223,229, 230,232,236 --	6
	-142	0.02uF "	"	C202 - 204,207, 208,210,212 - 214,216,219, 220,222,225, 226,228,231, 233,235,237 --	20
		Capacitor, electrolytic			
	1-121-439	1uF	15V	C238 ----------	1
	-371	10uF	25V	C201,205,206, 211,215,221, 227,234 ------	8
		Resistor, carbon			
	1-242-642	51 ohms ±5%	RD¼UR	R206,215,221 --	3
	-665	470 " "	"	R233 ----------	1
	-673	1K " "	RD¼SR	R204,205,209, 210,213,214, 218,219,238 --	9
	-698	11K " "	RD¼UR	R236 ----------	1
	-680	2K " "	"	R237 ----------	1
	-689	4.7K " "	"	R223,228 ------	2
	-695	8.2K " "	RD¼SR	R203,234 ------	2
	-699	12K " "	"	R227 ----------	1
	-702	16K " "	"	R202,207,211, 216 ----------	4
	-708	30K " "	"	R235 ----------	1
	-721	100K " "	RD¼UR	R220,226,231 --	3
	1-244-741	680K " "	RD¼SR	R240 ----------	1
	1-242-656	200 "	RD¼UR	R225,230,232 --	3
	-673	1K "	"	R224,229 ------	2

Ref. No.	Part No.	Description			Q'ty
	1-242-695	8.2K ohms	RD¼UR	R208,212,217 --	3
	-699	12K "	"	R222 ----------	1

iii) Limiter & Detector Section

		Mounted Circuit Board, limiter & detector section ----------			1
	1-538-773	Printed Circuit Board, limiter & detector section ----------			1
	1-221-389	Resistor, adjustable 5K ohms (B)		R319 --	1
	1-403-291	Transformer, discriminator		IFT301 ------	1
	1-407-165	Inductor, micro 47uH		L301,302 -------	2
		Transistor 2SC403A		X301 - 303 -----	3
		" 2SC633		X304 ----------	1
		Diode 1T243		D301 - 304 -----	4
		" 1T22AJ		D305,306 -------	2
		Capacitor, ceramic			
	1-101-882	51PF +5%	50V	C320 ----------	1
	-919	0.002uF (+80% -20%	25V	C304,305,309, 310 ----------	4
	-142	0.02uF "	"	C301 - 303,308, 312,313,321 ---	7
		Capacitor, styrol			
	1-103-603	120PF +5%	50V	C317,318 -------	2
		Capacitor, electrolytic			
	1-121-334	10uF	15V	C314 ----------	1
	-371	10uF	25V	C325 ----------	1
	-373	30uF	25V	C319 ----------	1
	-338	50uF	15V	C306,323 -------	2
	-340	100uF	15V	C311,324 -------	2
	-343	1uF	50V	C322 ----------	1
		Resistor, carbon			
	1-244-649	100 ohms +5%	RD¼SR	R305,308,316, 317 ---------	4
	1-242-659	270 " "	RD¼UR	R306 ---------	1

Ref. No.	Part No.	Description				Q'ty
	1-244-666	510 ohms	±5%	RD¼SR	R329 ----------	1
	-669	680 "	"	"	R303,310,315 --	3
	-670	750 "	"	"	R318 ----------	1
	-673	1K "	"	"	R304,311 ------	2
	-680	2K "	"	"	R323,327,328 --	3
	-689	4.7K "	"	"	R313 ----------	1
	-691	5.6K "	"	"	R301 ----------	1
	-693	6.8K "	"	"	R320,321 ------	2
	-695	8.2K "	"	"	R307 ----------	1
	-699	12K "	"	"	R302,309 ------	2
	-701	15K "	"	"	R314 ----------	1
	-709	33K "	"	"	R322,324 ------	2
	-721	100K "	"	"	R325 ----------	1
	-725	150K "	"	"	R326 ----------	1
	1-242-649	100 "	"	RD¼UR	R312 ----------	1

iv) Muting Circuit Section

	Mounted Circuit Board, muting circuit --			1
1-538-774	Printed Circuit Board, muting circuit --			1
1-407-177	Inductor, micro 470uH		L401,402 ------	2
	Field Effect Transistor 2SK23		X401 ----	1
	Transistor 2SC633		X402 - 410 -----	9
	Diode	1T22AJ	D401 - 405 -----	5
	"	10D-05	D406 ----------	1
	Thermistor S-10K		Th401 ----------	1

Resistor, solid adjustable

1-221-997	2.2K ohms		R403 ----------	1

Capacitor, ceramic

1-101-864	20PF	±5%	50V	C402 ----------	1
-142	0.02uF	(+100% -0%	"	C406 ----------	1

Capacitor, mylar

1-105-683	0.068uF	±10%	50V	C403 - 405 ----	3
-419	0.22uF	±20%	35V	C407 ----------	1

Ref. No.	Part No.	Description				Q'ty
		Capacitor, electrolytic				
	1-121-371	10uF	25V		C401 ----------	1
		Resistor, carbon				
	1-244-649	100 ohms	±5%	RD¼SR	R419 ----------	1
	-655	180 "	"	"	R424 ----------	1
	-656	200 "	"	"	R402,409,411 --	3
	-666	510 "	"	"	R431,427 ------	2
	-673	1K "	"	"	R423 ----------	1
	-693	6.8K "	"	"	R406 ----------	1
	-691	5.6K "	"	"	R418 ----------	1
	-695	8.2K "	"	"	R417 ----------	1
	-697	10K "	"	"	R405,415,420, 435,436 ------	5
	-701	15K "	"	"	R422 ----------	1
	-704	20K "	"	"	R426,428 ------	2
	-708	30K "	"	"	R408 ----------	1
	-714	51K "	"	"	R410,414,416 --	3
	-721	100K "	"	"	R412,413,425, 430,433 ------	5
	-732	300K "	"	"	R421 ----------	1
	-744	910K "	"	"	R401 ----------	1
	-715	56K "	"	"	R434,407 ------	2
	-713	47K "	"	"	R429 ----------	1
	-683	2.7K "	"	"	R404 ----------	1
	-713	47K "	"	"	R407 (Adjust)	1
	-714	51K "	"	"	R407 (")-	

V. MPX Decoder Section

	Mounted Circuit Board, MPX decoder -----	1
1-538-775	Printed Circuit Board, MPX decoder -----	1
1-221-389	Resistor, adjustable 5K ohms (B) R537 -	1
1-231-066	Filter, low pass ----------	1
1-409-138	Coil, trap L505 ----------	1
-139	Coil, trap L506 ----------	1
1-425-401	Transformer, MPX L503 ----------	1
-402	" , " L504 ----------	1
-403	" , " L501,502 ----------	2
1-515-101	Relay, reed REL-1 ----------	1

Ref. No.	Part No.	Description			Q'ty
		Transistor 2SC633		X501 - 503 --------	3
		" 2SC633		X504 - 513,515 ----	11
		" 2SC633		X514 ----------	1
		Diode 1T23J		D501,502 ----------	2
		" 1T22AJ		D503 - 507 --------	5
		Capacitor, styrol			
	1-103-605	150PF	±5% 50V	C504 ----------	1
	-611	270PF	" "	C521,522 ----------	2
	-575	4700PF	" "	C502,505,507 - 509, 513 ----------	6
		Capacitor, mylar			
	1-105-661-12	0.001uF	±10% 50V	C506,512 ----------	2
	-665-12	0.0022uF	" "	C529 ----------	1
	-681-12	0.047μF	" "	C514,515 ----------	2
	1-106-550-12	0.33uF	" 35V	C518,519,523,524 ---	4
	1-105-667-12	0.0033μF	" 50V	C516,517(Adjust) --	2
	-669-12	0.0047μF	" "	C516,517(")	
	-677-12	0.022uF	" "	C536,537(Adjust) --	2
	-667-12	0.0033μF	" "	C536,537(")	
		Capacitor, electrolytic			
	1-121-442	1uF	50V	C527,528 --------	2
	-371	10uF	25V	C525,526 --------	2
	-336	30uF	15V	C501 ----------	1
	-489	50uF	12V	C532 ----------	1
	-375	50uF	25V	C530 ----------	1
	-315	100uF	6V	C503 ----------	1
	-377	100uF	25V	C511,520 ----------	2
	-426	500uF	15V	C531 ----------	1
		Resistor, carbon			
	1-244-641	47 ohms	±5% RD¼SR	R574 ----------	1
	-649	100 "	" "	R516 ----------	1
	-658	240 "	" "	R506 ----------	1
	-666	510 "	" "	R519 - 522,551, 552,559,560, 563,564 --------	10
	-670	750 "	" "	R512 ----------	1

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Ref No.	Part No.	Description				Q'ty
	1-244-673	1K ohms	+5%	RD¼SR	R503,515,518, 525,526,533, 534 ----------	7
	-677	1.5K "	"	"	R539,540,577 ---	3
	-680	2K "	"	"	R538,541,542 ---	3
	-684	3K "	"	"	R517,543 - 546, 575 ----------	6
	-685	3.3K "	"	"	R523,524,576 ---	3
	-690	5.1K "	"	"	R514,557,558 ---	3
	-697	10K "	"	"	R535,536,553, 554,567,568, 573,578,579 ---	9
	-701	15K "	"	"	R555,556,561, 562,505 -------	5
	-704	20K "	"	"	R565,566 -------	2
	-708	30K "	"	"	R510 ----------	1
	-712	43K "	"	"	R509 ----------	1
	-714	51K "	"	"	R504 ----------	1
	-718	75K "	"	"	R507,513 -------	2
	-721	100K "	"	"	R508,511,527, 528,572 -------	5
	-734	360K "	"	"	R502 ----------	1
	-743	820K "	"	"	R529,530 -------	2
	-744	910K "	"	"	R549,550 -------	2
	-675	1.2K "	"	"	R501 ----------	1
	-649	100 "	"	"	R531,532(Adjust)	
	-656	200 "	"	"	R531,532(")	1
	-660	300 "	"	"	R531,532(")	
	-718	75K "	"	"	R547,548(Adjust)	
	-719	82K "	"	"	R547,548(")	1

vi) Power Supply Section

	Mounted Circuit Board, power supply ----		1
1-538-776	Printed Circuit Board, power supply ----		1
1-223-012	Resistor, adjustable; wire wound 500 ohms (B)	VR601 -------	1
1-526-502	Socket, power transistor ----------		1
	Transistor 2SD47	X601 ----------	1
	" 2SC470	X602 ----------	1
	" 2SC318	X603 ----------	1
	Diode 1T240	D602,603 --------	2
	" 10DB	D601 ----------	1

Ref. No.	Part No.	Description			Q'ty
		Capacitor, mylar			
	1-105-673	0.01uF	50V	C603 ----------	1
	-873	0.01uF	100V	C605 - 608 --------	4
		Capacitor, electrolytic			
	1-121-731	200uF	50V	C602 ----------	1
		Resistor, carbon			
	1-209-143	3.9 ohms	+5% R1	R608 ----------	1
	-164	390 "	" "	R609 ----------	1
	1-204-074	680 "	" "	R611 ----------	1
	1-203-033	1K "	" "	R610 ----------	1
	1-244-661	330 "	" RD¼SR	R604 ----------	1
	-675	1.2K "	" "	R605 ----------	1
	-689	4.7K "	" "	R601,603 --------	2
	-695	8.2K "	" "	R602 ----------	1
	1-209-044	100 "	" R1	R606 (Adjust)	
	-160	120 "	" "	R606 (") --	1
	1-204-276	150 "	" "	R606 (")	
	1-209-162	220 "	" "	R607 (Adjust)	
	-163	270 "	" "	R607 (") --	1
	1-204-277	330 "	" "	R607 (")	

vii) General Section

	Mounted Circuit Board, balun ----------	1
1-538-771	Printed Circuit Board, balun ----------	1
1-221-276	Resistor, variable 5K ohms (T) R241,330-	2
-779	" , " 10K " (B) R569,570-	2
1-222-113	Control, muting level with switch SW4 --	1
1-231-057	Encapsulated Component 0.033uF+120 ohms VR401 ----------	1
1-417-014-21	Balun (antenna matching transformer) B101	1
1-441-381	Power Transformer ----------	1
1-507-164	Jack, 4-pin ----------	1
1-514-369	Switch, lever; power ON/OFF SW1 -------	1
-338	" , " ; mode SW3 -------	1
-370	" , rotary; hi-blend SW2 -------	1
1-517-025	Socket, pilot lamp ----------	3
1-518-061	Lamp, pilot. PL3,4 ----------	2
1-514-524	Switch, slide; de-emphasis SW5 -------	1

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Ref. No.	Part No.	Description	Q'ty
	1-518-062	Lamp, pilot PL5	1
	-070	" " (cylinder) PL1,2	2
	1-520-060	Meter, tuning M1	1
	-061	" , tuner input M2	1
	1-526-165	Socket, voltage selector VS	1
	1-532-145	Fuse, UL F	1
	1-533-051	Holder, lamp	2
	-048	Post, fuse	1
	1-534-330	Cord, power	1
	1-535-029	Terminal, test point TP2 - 4	3
		Capacitor, mylar	
	1-105-679	0.033uF 50V C535	1
	-683	0.068uF " C534	1
	-687	0.15uF " C533	1
		Capacitor, electrolytic	
	1-121-030	2000uF 50V C601	1
	-328	2000uF 35V C604	1
		Resistor, carbon	
	1-204-128	1.0 ohms ±5% RD1P R704,705	2
	1-244-818	5.1 " " RD½SP R702,703	2

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Additional Parts for Canada Model

2-047-256	Label, specification	1
-259	Label, fuse caution	1
-260	Label, CSA	1
2-029-991	Label, caution	1
1-532-164	Fuse	1
1-201-564	Resistor, composition RC½ 750K ohms R701	1
7-621-770-40	Screw, machine (+) B 3 x 10	1
3-701-041	Label, CSA	1

Ref. No.	Part No.	Description	Q'ty
	Additional Parts for General Model		
	2-047-255	Label, specification	1
	2-029-953	Label, voltage	1
	3-790-768-11	Manual, instruction	1
	1-532-164	Fuse	1
	1-534-241-15	Cord, power	1
	3-793-082	Supplement	1

Complete Spare Parts List for ST-5000FW(A) (UL, CSA, E)

Sept. 24, 1968

Ref. No.	Part No.	Description	Q'ty
I. Mechanical Parts			
	i) Front End Section		
	X-38526-01	Shaft Ass'y	1
	X-38512-01	Boss Ass'y, gear	1
	-03	Shaft Ass'y, drum	1
	3-852-602	Chassis, front end	1
	-603	Case, shield	1
	-604	Plate, shield	1
	0-029-624	Spring, gear	1
	3-851-219	Nut	1
	-809	Washer, large	4
	-220	Drum	1
	ii) Main Chassis		
A5	X-20472-01	Chassis Ass'y	1
A6	-02	Sub-panel Ass'y	1
A7	-03	Case Ass'y, shield; limiter & detector -	1
A8	-04	Case Ass'y, shield; IF section	1
A9	-05	Bracket Ass'y, flywheel	1
A10	-06	Guide Ass'y, pointer	1
A11	-07	Pointer Ass'y	1
A12	-08	Plate Ass'y, pulley	1
A13	-09	Knob Ass'y, mode selector	1
A14	X-20319-01	Terminal Ass'y, output	4
A15	X-20320-03	Knob Ass'y, muting & yi-blend	2
A16	X-38240-07	Knob Ass'y, tuning	1
13	2-047-106	Cushion A, light interception	1
14	-107	Cushion B, light interception	1
15	-211	Rivet	6
16	-226	Panel, front	1
17	-227	Plate, bottom	1
18	-228	Bracket, meter	1
19	-229	Plate, dial back; upper	1
20	-230	Plate, antenna terminal; black	1
22	-232	Cushion, dial plate	2

Ref. No.	Part No.	Description	Q'ty
23	2-047-233	Holder, dial plate	2
24	-234	Panel, rear	1
25	-235	Plate, dial back; lower	1
26	-236	Shaft, tuning	1
27	-237	Heat Sink, 2SD47	1
28	-238	Bracket, electrolytic capacitor	1
29	-239-22	Plate, dial scale	1
30	-240	Cushion, rubber	1
31	-241	Insulator, pilot lamp	2
32	-242	Spacer, dial plate	1
33	-243	Cover, stereo lamp	1
34	-244	Label, specification (UL)	1
35	2-056-001	Label (A), IF	1
36	2-047-246	Label, limiter& detector	1
37	-248	Label, test point	1
38	-249	Spacer, dial plate (right)	1
39	-250	Spacer, dial plate (left)	1
41	-252	Rubber B, black	2
	-258	Screw, adjustable	1
42	0-051-263	Foot, rubber	4
43	0-204-214	Screw, front end	4
44	-220	Cushion, front end	4
45	2-029-921	Cover, chassis	1
46	-930	Screw, chassis cover	4
47	-931	Knob, power ON/OFF switch	1
48	2-043-776	Bracket, front panel	4
49	3-401-179	Lug, wire retaining	2
50	3-410-032	Grommet, power cord	1
51	3-422-204	Label, caution	1
52	3-802-520	Spring, dial drum	1
53	3-811-140	Pulley, small	5
54	-819	Label, FCC	1
55	3-824-019	Indicator, stereo	1
56	-033	Retainer, stereo indicator	1
57	-034	Bracket, stereo lamp	1
58	-036	Filter, meter lamp	2
59	-039	Holder, tuning shaft	1
60	-040	Disc, tuning shaft holder	1
61	-041	Flywheel	1
62	-046	Plate, adjustable resistor	1
63	-059	Packing	2
64	2-047-251	Felt, back	2
	7-633-120-32	String, dial	1,500mm

Ref. No.	Part No.	Description	Q'ty
65	2-056-002	Attachment (A), cover	1
66	-003	Attachment (B), cover	1
67	-004	Cover (A), front end	1
68	-005	Label (A), front end	1
69	-008	Case	4

II. Accessories & Packing Materials

1-501-083	Antenna, ribbon	1
1-532-145	Fuse, UL	1
1-534-049	Cord, connection RK-56	1
3-413-100	Bag, polyethylene; complete set	1
3-701-020	Bag, polyethylene; manual, etc.	1
-026	Label, tack	1
3-790-768-32	Manual, instruction	1
3-797-795-31	Card, warranty	1
4-404-717	Card, inspection	1
X-44900-02	Cloth, polishing	1
7-491-001	Desiccant	1
2-029-944	Cushion, packing	2
3-824-055	Carton	1
3-824-060	Box, accessory	1
-061	Carton, master (for two sets)	½

III. Screws, Washers & Nuts

i) Front End Section

7-621-261-33	Screw, machine (+) RF 3 x 5	9
-713-27	" , setting 3 x 4	1
-999-72	" , hexagonal 3 x 4	1
7-623-208-22	Washer, spring 3ø	9

ii) Main Chassis

7-621-255-19	Screw, machine (+) RF 2 x 3	4
-259-32	" " (+) RF 2.6 x 5	6
-261-24	" " (+) RF 3 x 4	4
-261-43	" " (+) RF 3 x 6	58
-268-42	" " (+) RF 4 x 6	8
-268-73	" " (+) RF 4 x 12	4

Ref. No.	Part No.	Description	Q'ty
	7-621-461-47	Screw, machine (+) T 3 x 6 ----------	4
	-713-27	" , setting 3 x 4 ----------	2
	-722-31	" , self-tapping 3 x 5 ----------	4
	-770-26	" , machine (+) B 3 x 6 ----------	5
	-39	" , " (+) B 3 x 8 ----------	6
	-43	" , " (+) B 3 x 6 ----------	4
	-773-68	" , " (+) B 3 x 14 ----------	2
	-771-33	" , " (+) B 2.6 x 5 ----------	2
	7-622-108-02	Nut 3ϕ ----------	4
	-312-02	" 5ϕ ----------	1
	7-623-108-13	Washer, plain 3ϕ ----------	16
	-110-13	" , " 4ϕ ----------	4
	-107-21	Washer 2.6ϕ (large) ----------	1
	-207-15	" , spring 2.6ϕ ----------	5
	-208-15	" , " 3ϕ ----------	60
	-210-15	" , " 4ϕ ----------	8
	-408-01	" , lock 3ϕ ----------	2
	-508-01	Lug 3ϕ ----------	3
	-510-01	" 4ϕ ----------	1
	-611-00	Eyelet 1.5 x 3 ----------	1
	7-633-120-32	String, dial 1,500mm ----------	1

IV. Electrical Parts

1) Front End Section

	Y-20560-51	Front End, completed (FF-010A) ---------	1
		Mounted Circuit Board, IFT ----------	1
	1-538-989	Printed Circuit Board, IFT ----------	1
		Field Effect Transistor TX-133K X101,105	2
		" " " 2SK23 X102 ---	1
		Transistor 2SC629 X104 ----------	1
		" 2SC629 X103 ----------	1
	1-401-368	Coil, antenna L101 ----------	1
	1-403-295	FM/IFT IFT101 ---------	1
	1-405-375	Coil, oscillator L105 ----------	1
	1-425-514	Coil (1), RF L102 ----------	1
	-515	" (2), RF L103 ----------	1
	-516	" (3), RF L104 ----------	1
	1-141-081	Trimmer, ceramic CT101 - 105 ----	5
	1-151-189	Capacitor, tuning; 5 gang CV101 - 105--	1

Ref. No.	Part No.	Description				Q'ty
		Capacitor, ceramic				
	1-101-875	7pF	±0.5pF	50WV	C121 ----------	1
	1-102-893	18pF	±5%	"	C101,107 ------	2
	1-101-864	20pF	"	"	C120 ----------	1
	-142	0.02uF	+80% -20%	"	C102,123,124, 111,112,114, 115,116 ------	8
	1-102-879	16pF	±5%	50WV	C103,108 ------	2
	-077	0.01uF		25WV	C104,105,109, 118,119 ------	5
		Capacitor, mold				
	1-101-936	0.5pF	±10%	500WV	C106 ----------	1
		Capacitor, electrolytic				
	1-121-371	10uF		25WV	C113,117 ------	2
		Resistor, carbon				
	1-244-642	51 ohms	±5%	RD¼SR	R105,111,113 ------	3
	-657	220 "	"	"	R102 ----------	1
	-661	330 "	"	"	R112 ----------	1
	-665	470 "	"	"	R104 ----------	1
	-666	510 "	"	"	R116 ----------	1
	-673	1K "	"	"	R110,108 ----------	2
	-677	1.5K "	"	"	R115 ----------	1
	-685	3.3K "	"	"	R114 ----------	1
	-689	4.7K "	"	"	R107 ----------	1
	-692	6.2K "	"	"	R118 ----------	1
	-697	10K "	"	"	R106,117 ----------	2
	-708	30K "	"	"	R103 ----------	1
	-753	2.2M "	"	"	R101 ----------	1
	-648	91 "	"	"	R119 ----------	1
ii)	**IF Section**					
		Mounted Circuit Board, IF circuit ------				1
	1-538-988	Printed Circuit Board, IF circuit ------				1
		Transistor 2SC403A X201 - 206 --------				6

Ref. No.	Part No.	Description		Q'ty
		Diode, zener 1T243	D201 - 208 --------	8
		" " 1T22A	D209,210 ----------	2
		" " 1S-1555	D211 ----------	1
		Resistor, adjustable		
	1-221-986	330 ohms (B)	R211 ----------	1
	1-403-297	Filter, ceramic	CF201 - 208 -------	8
	1-407-187	Inductor, micro 5.6uH	L202 ----------	1
	-165	" , " 47uH	L201,203 --------	2
	-177	" , " 470uH	L204 ----------	1
		Capacitor, ceramic		
	1-101-141	0.01uF (+100% - 0% 50WV	C208,213,217,219, 223,224,225, 227 ----------	8
	-142	0.02uF " "	C201,202,204,205, 206,209,210,212, 214,216,218,220, 221,226,228,230, 231 ----------	17
		Capacitor, electrolytic		
	1-121-371	10uF 25WV	C203,207,211, 215,222 --------	5
	-439	1uF 15WV	C229 ----------	1
		Resistor, carbon		
	1-244-642	51 ohms ±5% RD¼SR	R207,218,227 ------	3
	-665	470 " " "	R243 ----------	1
	-671	820 " " "	R206,217,228,250 --	4
	-673	1K " " "	R213,232,233,239, 222,223 ----------	6
	-677	1.5K " " "	R202,209,220,230 --	4
	-680	2K " " "	R246 ----------	1
	-689	4.7K " " "	R238 ----------	1
	-701	15K " " "	R237 ----------	1
	-708	30K " " "	R244 ----------	1

Ref. No.	Part No.	Description		Q'ty
	1-244-721	100K ohms ±5% RD¼SR	R215,225,235 ------	3
	1-242-649	100 " ±0.5% RD¼UR	R240,242 ----------	2
	-653	150 " " "	R203,210,214,216, 221,224,226,231 --	8
	-656	200 " " "	R234,236 ----------	2
	-660	300 " " "	R249 ----------	1
	-673	1K " " "	R204,205,212,247 --	4
	-685	3.3K " " "	R201,208,219,229 --	4
	-698	11K " " "	R245 ----------	1
	-721	100K " " "	R241 ----------	1
	-741	680K " " "	R248 ----------	1

iii) Limiter & Detector Section

	Mounted Circuit Board, limiter & detector section ----------		1
1-538-773	Printed Circuit Board, limiter & detector section ----------		1
1-221-389	Resistor, adjustable 5K ohms (B)	R319 --	1
1-403-291	Transformer, discriminator	IFT301 ------	1
1-407-165	Inductor, micro 47uH	L301,302 ---------	2
	Transistor 2SC403A	X301 - 303 -------	3
	" 2SC633	X304 ----------	1
	Diode, zener 1T243	D301 - 304 -------	4
	" " 1T22AJ	D305,306 ---------	2

Capacitor, ceramic

1-101-882	51pF	±5% 50V	C320 ----------	1
-919	0.002uF	+80% -20% 25V	C304,305,309,310 --	4
-142	0.02uF	" "	C301 - 303, 308, 312,313,321 ------	7

Capacitor, styrol

1-103-603	120pF	±5% 50V	C317,318 ----------	2

Capacitor, electrolytic

1-121-334	10uF	15V	C314 ----------	1
-371	10uF	25V	C325 ----------	1

Ref. No.	Part No.	Description			Q'ty
	1-121-373	30uF	25V	C319 ----------	1
	-338	50uF	15V	C306,323 ----------	2
	-340	100uF	15V	C311,324 ----------	2
	-343	1uF	50V	C322 ----------	1
		Resistor, carbon			
	1-244-649	100 ohms	±5% RD¼SR	R305,308,316,317 --	4
	1-242-659	270 "	" RD¼UR	R306 ----------	1
	1-244-666	510 "	" RD¼SR	R329 ----------	1
	-669	680 "	" "	R303,310,315 ------	3
	-670	750 "	" "	R318 ----------	1
	-673	1K "	" "	R304,311 ----------	2
	-680	2K "	" "	R323,327,328 ------	3
	-689	4.7K "	" "	R313 ----------	1
	-691	5.6K "	" "	R301 ----------	1
	-693	6.8K "	" "	R320,321 ----------	2
	-695	8.2K "	" "	R307 ----------	1
	-699	12K "	" "	R302,309 ----------	2
	-701	15K "	" "	R314 ----------	1
	-709	33K "	" "	R322,324 ----------	2
	-721	100K "	" "	R325 ----------	1
	-725	150K "	" "	R326 ----------	1
	1-242-649	100 "	" RD¼UR	R312 ----------	1
	iv) **Muting Circuit Section**				
		Mounted Circuit Board, muting circuit --			1
	1-538-774	Printed Circuit Board, muting circuit --			1
	1-407-177	Inductor, micro 470uH		L401,402 -------	2
		Transistor 2SK23		X401 ----------	1
		" 2SC633		X402 - 409 -----	8
		" 2SC633		X410 ----------	1
		Diode 1T22AJ		D401 - 405 -----	5
		" 10D-05		D406 ----------	1
		Thermistor S-10K		Th401 ----------	1
		Resistor, solid adjustable			
	1-221-997	2.2K ohms		R403 ----------	1

Ref. No.	Part No.	Description				Q'ty
		Capacitor, ceramic				
	1-101-269	13pF	±5%	50V	C402 ----------	1
	-142	0.02uF		"	C406 ----------	1
		Capacitor, mylar				
	1-105-683	0.068uF	±10%	50V	C403 ~ 405 --------	3
	-419	0.22uF	±20%	35V	C407 ----------	1
		Capacitor, electrolytic				
	1-121-371	10uF		25V	C401 ----------	1
		Resistor, carbon				
	1-244-649	100 ohms	±5%	RD¼SR	R419 ----------	1
	-655	180 "	"	"	R424 ----------	1
	-656	200 "	"	"	R402,409,411 ------	3
	-666	510 "	"	"	R431,427 ----------	2
	-673	1K "	"	"	R423 ----------	1
	-693	6.8K "	"	"	R406 ----------	1
	-691	5.6K "	"	"	R418 ----------	1
	-695	8.2K "	"	"	R417 ----------	1
	-697	10K "	"	"	R405,415,420,435, 436 ----------	5
	-701	15K "	"	"	R422 ----------	1
	-704	20K "	"	"	R426,428 ----------	2
	-708	30K "	"	"	R408 ----------	1
	-714	51K "	"	"	R410,414,416 ------	3
	-721	100K "	"	"	R412,413,425,430, 433 ----------	5
	-732	300K "	"	"	R421 ----------	1
	-744	910K "	"	"	R401 ----------	1
	-715	56K "	"	"	R434,407 ----------	2
	-713	47K "	"	"	R429 ----------	1
	-683	2.7K "	"	"	R404 ----------	1
	-713	47K "	"	"	R407 (Adjust) ----	1
	-714	51K "	"	"	R407 (")	

Ref. No.	Part No.	Description	Q'ty
V.	MPX Decoder Section		
		Mounted Circuit Board, MPX decoder -----	1
	1-538-775	Printed Circuit Board, MPX decoder -----	1
	1-221-389	Resistor, adjustable 5K ohms (B) R537 --	1
	1-231-066	Filter, low pass ----------	1
	1-409-138	Coil, trap L505 ----------	1
	-139	Coil, trap L506 ----------	1
	1-425-401	Transformer, MPX L503 ----------	1
	-402	" , " L504 ----------	1
	-403	" , " L501,502 ----------	2
	1-515-101	Relay, reed REL-1 ----------	1
		Transistor 2SC633 X501 - 503 --------	3
		" 2SC633 X504 - 513, 515 ---	11
		" 2SC633 X514 ----------	1
		Diode 1T23J D501,502 ----------	2
		" 1T22AJ D503 - 507 --------	5
		Capacitor, styrol	
	1-103-605	150pF ±5% 50V C504 ----------	1
	-611	270pF " " C521,522 ----------	2
	-575	4700pF " " C502,505,507 - 509, 513 ----------	6
		Capacitor, mylar	
	1-105-661-12	0.001uF ±10% 50V C506,512 ----------	2
	-665-12	0.0022uF " " C529 ----------	1
	-681-12	0.047μF " " C515,514 ----------	2
	1-106-550-12	0.33uF " 35V C518,519,523,524 --	4
	1-105-667-12	0.0033μF " 50V C516,517(Adjust) -	2
	-669-12	0.0047μF " " C516,517(")	
	-677-12	0.022μF " " C536,537(Adjust) -	2
	-667-12	0.0033μF " " C536,537(")	
		Capacitor, electrolytic	
	1-121-442	1uF 50V C527,528 ----------	2
	-371	10uF 25V C525,526 ----------	2
	-336	30uF 15V C501 ----------	1
	-489	50uF 12V C532 ----------	1
	-375	50uF 25V C530 ----------	1

Ref. No.	Part No.	Description				Q'ty
	1-121-315	100uF	6V		C503 ----------	1
	-377	100uF	25V		C511,520 ----------	2
	-426	500uF	15V		C531 ----------	1
		Resistor, carbon				
	1-244-641	47 ohms	±5%	RD¼SR	R574 ----------	1
	-649	100 "	"	"	R516 ----------	1
	-658	240 "	"	"	R506 ----------	1
	-666	510 "	"	"	R519 - 522, 551, 552,559,560,563, 564 ----------	10
	-670	750 "	"	"	R512 ----------	1
	-673	1K "	"	"	R503,515,518,525, 526,533,534 ------	7
	-677	1.5K "	"	"	R539,540,577 ------	3
	-680	2K "	"	"	R538,541,542 ------	3
	-684	3K "	"	"	R517,543 - 546,575-	6
	-685	3.3K "	"	"	R523,524,576 ------	3
	-690	5.1K "	"	"	R514,557,558 ------	3
	-697	10K "	"	"	R535,536,553,554, 567,568,573,578, 579 ----------	9
	-701	15K "	"	"	R555,556,561,562, 505 ----------	5
	-704	20K "	"	"	R565,566 ----------	2
	-708	30K "	"	"	R510 ----------	1
	-712	43K "	"	"	R509 ----------	1
	-714	51K "	"	"	R504 ----------	1
	-718	75K "	"	"	R507,513 ----------	2
	-721	100K "	"	"	R508,511,527,528, 572 ----------	5
	-734	360K "	"	"	R502 ----------	1
	-743	820K "	"	"	R529,530 ----------	2
	-744	910K "	"	"	R549,550 ----------	2
	-675	1.2K "	"	"	R501 ----------	1
	-649	100 "	"	"	R531,532 (Adjust)	
	-656	200 "	"	"	R531,532 (")	1
	-660	300 "	"	"	R531,532 (")	
	-718	75K "	"	"	R547,548 (Adjust)	
	-719	82K "	"	"	R547,548 (")	1

Ref. No.	Part No.	Description			Q'ty
	vi) Power Supply Section				
		Mounted Circuit Board, power supply		----	1
1-538-776		Printed Circuit Board, power supply		----	1
1-223-010		Resistor, adjustable; wire wound ½W 200 ohms (B)	VR601	----------	1
1-526-502		Socket, power transistor		----------	1
		Transistor 2SD47	X601	----------	1
		" 2SC470	X602	----------	1
		" 2SC318	X603	----------	1
		Diode 1T240	D602,603	----------	2
		" 10DB	D601	----------	1
		Capacitor, mylar			
1-105-673		0.01uF 50V	C603	----------	1
-873		0.01uF 100V	C605 - 608	--------	4
		Capacitor, electrolytic			
1-121-731 -385)		200uF 50V	C602	----------	1
		Resistor, carbon			
1-209-143		3.9 ohms ±5% R1	R608	----------	1
-164		390 " " "	R609	----------	1
1-204-074		680 " " "	R611	----------	1
1-203-033		1K " " "	R610	----------	1
1-244-665		470 " " RD¼SR	R604	----------	1
-674		1.1K " " "	R605	----------	1
-689		4.7K " " "	R601,603	----------	2
-695		8.2K " " "	R602	----------	1
1-209-044		100 " " R1	R606 (Adjust)	)	
-160		120 " " "	R606 (")	) ----	1
1-204-276		150 " " "	R606 (")	)	
1-209-162		220 " " "	R607 (Adjust)	)	
-163		270 " " "	R607 (")	) ----	1
1-204-277		330 " " "	R607 (")	)	
	vii) General Section				
		Mounted Circuit Board, balun		----------	1

Ref. No.	Part No.	Description	Q'ty
	1-538-771	Printed Circuit Board, balun ----------	1
	1-221-276	Resistor, variable 5K ohms (T) R241,330-	2
	-779	" , " 10K " (B) R569,570-	2
	1-222-113	Control, muting level with switch SW4,VR401 ---------	1
	1-231-057	Encapsulated Component 0.033uF+120 ohms CP ----------	1
	1-417-014-21	Balun B101 ----------	1
	1-441-381	Power Transformer PT ----------	1
	1-507-164	Jack, 4-pin ----------	1
	1-514-369	Switch, lever; power ON/OFF SW1 --------	1
	-338	" , " ; mode SW3 --------	1
	-370	" , rotary; hi-blend SW2 --------	1
	1-517-025	Socket, pilot lamp ----------	3
	1-518-061	Lamp, pilot RL3,4 ----------	2
	-062	" , " PL5 ----------	1
	-070	" , " (cylinder) PL1,2 ----------	2
	1-520-060	Meter, tuning M1 ----------	1
	-061	" , tuner input M2 ----------	1
	1-526-165	Socket, voltage selector VS ----------	1
	1-532-218	Fuse, UL F ----------	1
	1-533-051	Holder, lamp ----------	2
	-048	Post, fuse ----------	1
	1-534-330	Cord, power ----------	1
	1-535-029	Terminal, test point TP2 - 4 ----------	3
	1-514-524	Switch, slide; de-emphasis SW5 -------	1
		Capacitor, mylar	
	1-105-679	0.033uF 50V C535 ----------	1
	-683	0.068uF " C534 ----------	1
	-687	0.15uF " C533 ----------	1
		Capacitor, electrolytic	
	1-121-030	2000uF 50V C601 ----------	1
	-328	2000uF 35V C604 ----------	1
		* * * *	
		Additional Parts for Canada Model	
	2-047-256	Label, specification ----------	1
	-259	Label, fuse caution ----------	1

Ref. No.	Part No.	Description	Q'ty
	2-029-991	Label, caution	1
	1-532-164	Fuse	1
	1-201-564	Resistor, composition RC½ 750K ohms R701	1
	7-621-770-40	Screw, machine (+) B 3 x 10	1
	3-790-768-41	Manual, instruction	1

Additional Parts for Genral Model

	2-047-255	Label, specification	1
	2-029-953	Label, voltage	1
	3-790-768-11	Manual, instruction	1
	1-532-164	Fuse	1
	3-793-082	Supplement	1

FM STEREO TUNER

ST-5000FW

SUPPLEMENT

NO. 1
Oct. '70

Subject: Minor change on Model ST-5000FW

1. INTRODUCTION

SONY made a change on Model ST-5000FW to eliminate troublesome de-emphasis changeover operation.

2. DESCRIPTION OF THE MODIFICATIONS

(a) De-emphasis Changeover Circuit Added

The de-emphasis changeover circuit has employed to change the de-emphasis time constant easily. The specified de-emphasis time constant is 75 micro-seconds in USA and Canada, 50 micro-seconds in Europe. The schematic diagram is given on page 2.

Parts Added

MPX decoder section

Reference	*Value*	*Part Number*
C536, C537	0.022 μF (mylar) and 0.0033 μF (mylar)	1-105-677-12 and 1-105-667-12
S5 (slide switch)		1-514-524

SONY SERVICE MANUAL

Parts Changed

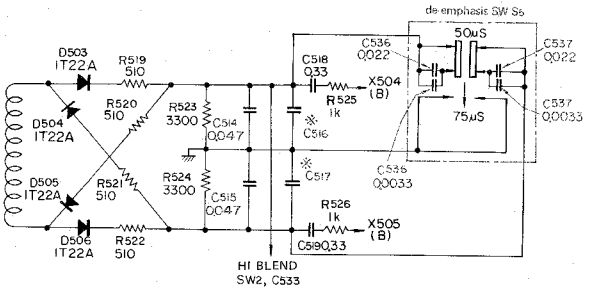
Description	*Changed to*
C514, C515, 0.068 μF	0.047 μF (mylar) (1-105-681-12)
C516, C517, 0.015 μF	0.0033 μF (mylar) (1-105-677-12) or 0.0047 μF (mylar) (1-105-669-12)

Applicable Serial Number

For USA Model	*For Canada Model*	*For General Export Model*
86,442 and later	75,196 and later	56,666 and later

SCHEMATIC DIAGRAM

–Additional AFC Switch and its related circuit–



SONY CORPORATION

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Revised

Complete Spare Parts List for ST-5000FW (UL, CSA, E)

July 30, 1968

Ref. No.	Part No.	Description	Q'ty
I. Mechanical Parts			
		i) Front End Section	
A1	X-38518-01	Foil Ass'y, copper	1
A2	X-38512-01	Boss Ass'y, gear	1
A3	-02	Stopper Ass'y	1
A4	-03	Shaft Ass'y, drum	1
1	3-851-801	Chassis, front end	1
2	-802	Case, shield	1
3	-803	Plate A, shield	1
4	-804	Plate B, shield	1
5	-805	Plate C, shield	3
6	-806	Plate D, shield	1
7	-809	Washer, large	4
8	-810	Label, front end	1
9	-219	Nut	1
10	-220	Drum	1
11	-222	Bar, short	1
12	0-029-624	Spring, gear	1
		ii) Main Chassis	
A5	X-20472-01	Chassis Ass'y	1
A6	-02	Sub-panel Ass'y	1
A7	-03	Case Ass'y, shield; limiter & detector -	1
A8	-04	Case Ass'y, shield; IF section	1
A9	-05	Bracket Ass'y, flywheel	1
A10	-06	Guide Ass'y, pointer	1
A11	-07	Pointer Ass'y	1
A12	-08	Plate Ass'y, pulley	1
A13	-09	Knob Ass'y, mode selector	1
A14	X-20319-01	Terminal Ass'y, output	4
A15	X-20320-03	Knob Ass'y, muting & hi-blend	2
A16	X-38240-07	Knob Ass'y, tuning	1
13	2-047-106	Cushion A, light interception	1
14	-107	Cushion B, light interception	1
15	-211	Rivet	6
16	-226	Panel, front	1

Ref. No.	Part No.	Description	Q'ty
17	2-047-227	Plate, bottom	1
18	-228	Bracket, meter	1
19	-229	Plate, dial back ; upper	1
20	-230	Plate, antenna terminal; black	1
22	-232	Cushion, dial plate	2
23	-233	Holder, dial plate	2
24	-234	Panel, rear	1
25	-235	Plate, dial back; lower	1
26	-236	Shaft, tuning	1
27	-237	Heat Sink, 2SD47	1
28	-238	Bracket, electrolytic capacitor	1
29	-239	Plate, dial	1
30	-240	Cushion, rubber	1
31	-241	Insulator, pilot lamp	2
32	-242	Spacer, dial plate	1
33	-243	Cover, stereo lamp	1
34	-244	Label, specification (UL)	1
35	-245	√Label, IF amplifier	1
36	-246	Label, limiter & detector	1
37	-248	Label, test point	1
38	-249	Spacer, dial plate (right)	1
39	-250	Spacer, dial plate (left)	1
41	-252	Rubber, black	2
	-258	Screw, adjustable	1
42	0-051-263	Foot, rubber	4
43	0-204-214	Screw, front end	4
44	-220	Cushion, front end	4
45	2-029-921	Cover, chassis	1
46	-930	Screw, chassis cover	4
47	-931	Knob, power ON/OFF switch	1
48	2-043-776	Bracket, front panel	4
49	3-401-179	Lug, wire retaining	2
50	3-410-032	Grommet, power cord	1
51	3-422-204	Label, caution	1
52	3-802-520	Spring, dial drum	1
53	3-811-140	Pulley, small	5
54	-819	Label, FCC	1
55	3-824-019	Indicator, stereo	1
56	-033	Retainer, stereo indicator	1
57	-034	Bracket, stereo lamp	1
58	-036	Filter, meter lamp	2
59	-039	Holder, tuning shaft	1
60	-040	Disc, tuning shaft holder	1

Ref. No.	Part No.	Description	Q'ty
61	3-824-041	Flywheel	1
62	-046	Plate, adjustable resistor	1
63	3-409-124	Washer, nylon	2
	7-633-120-32	String, dial	1,500mm

II. Accessories & Packing Materials

1-501-083	Antenna, ribbon	1
1-532-218	Fuse, UL	1
1-534-049	Cord, connection RK-56	1
3-413-100	Bag, polyethylene; complete set	1
3-701-020	Bag, polyethylene; manual, etc.	1
-026	Label, tack	1
3-790-768-32	Manual, instruction	1
3-994-399	Card, warranty	1
4-404-717	Card, inspection	1
X-44900-02	Cloth, polishing	1
7-491-001	Desiccant	1
2-029-944	Cushion, packing	2
3-824-055	Carton	1
3-824-060	Box, accessory	1
-061	Carton, master (for two sets)	½

III. Screws, Washers & Nuts

i) Front End Section

7-621-259-32	Screw, machine (+) RF 2.6 x 5	1
-461-28	" , " (+) T 3 x 4	4
-770-43	" , " (+) B 3 x 6	6
-53	" , " (+) B 3 x 5	18
-713-22	" , setting 3 x 4	1
-999-72	" , hexagonal 3 x 4	4
7-623-107-25	Washer, plain 2.6ø	1
-208-15	" , spring 3ø	24
-408-05	" , lock 3ø	1
-508-01	Lug 3ø	1

ii) Main Chassis

7-621-255-19	Screw, machine (+) RF 2 x 3	4
-259-32	" , " (+) RF 2.6 x 5	5

Ref. No.	Part No.	Description	Q'ty
	7-621-261-43	Screw, machine (+) RF 3 x 6	58
	-268-42	" , " (+) RF 4 x 6	8
	-268-73	" , " (+) RF 4 x 12	4
	-713-27	" , setting 3 x 4	2
	-722-31	" , self-tapping 3 x 5	4
	-770-26	" , machine (+) B 3 x 6	5
	-39	" , " (+) B 3 x 8	6
	-43	" , " (+) B 3 x 6	4
	-773-68	" , " (+) B 3 x 14	2
	-771-33	" , " (+) B 2.6 x 5	2
	7-622-108-02	Nut 3ø	4
	-312-02	" 5ø	1
	7-623-108-13	Washer, plain 3ø	16
	-110-13	" , " 4ø	4
	-207-15	" , spring 2.6ø	5
	-208-15	" , " 3ø	60
	-210-15	" , " 4ø	8
	-408-01	" , lock 3ø	2
	-508-01	Lug 3ø	3
	-510-01	" 4ø	1
	-611-00	Eyelet 1.5 x 3	1
	7-671-114-01	Steel Ball 4ø	1

IV. Electrical Parts

i) Front End Section

Y-20472-51	Front End, completed (FMC-105W1)	1
	Mounted Circuit Board, IFT	1
1-538-770	Printed Circuit Board, IFT	1
	Field Effect Transistor 2SK22DF X101,103,105,106	4
1-141-067	Capacitor, trimmer; cylinder CT101 - 105	5
1-102-019	Capacitor, feed through C120 - 127	8
1-151-164	Capacitor, tuning; 5 gang CV101 - 105	1
1-401-332	Coil, antenna L101	1
1-403-282	Transformer, IF IFT101	1
-286	" , IF IFT102	1
1-405-329	Coil, oscillator L106	1
1-407-184	Inductor, micro 3.3uF L107 - 110	4
1-425-397	Coil (1), RF L102	1

Ref. No.	Part No.	Description				Q'ty
	1-425-398	Coil (2), RF		L103	----------	1
	-399	" (3), RF		L104	----------	1
	-400	", mixer		L105	----------	1
		Capacitor, ceramic				
	1-101-952	2PF	±0.5PF	25V	C111 ---------	1
	-869	27P	±5%	"	C116 ---------	1
	-140	0.005uF	(+80, -20%	"	C118 ---------	1
	-141	0.01uF	"	"	C113 ---------	1
	-972	18PF	±5%		C104,106,110 -	3
	1-102-861	20PF	"		C115 ---------	1
	1-101-938	1.5PF	±10%	500V	C105 ---------	1
	-142	0.02uF		25V	C103,109 -----	2
	-973	20PF			C101 ---------	1
		Capacitor, mylar				
	1-105-673	0.01uF	±10%	50V	C119 ---------	1
		Resistor, carbon				
	1-244-653	150 ohms	±5%	RD¼SR	R105 ---------	1
	-665	470 "	"	"	R110 ---------	1
	-670	750 "	"	"	R113 ---------	1
	-671	820 "	"	"	R115 ---------	1
	-680	2K "	"	"	R104,108 -----	2
	-685	3.3K "	"	"	R112 ---------	1
	-709	33K "	"	"	R109,111 -----	2
	-751	1.8M "	"	"	R114 ---------	1
	-753	2.2M "	"	"	R102,106 -----	2

ii) IF Section

	Mounted Circuit Board, IF circuit	------	1
1-538-772	Printed Circuit Board, IF circuit	------	1
1-403-293	Filter, solid state MF-1,2,3	--------	3
1-407-165	Inductor, micro 47uH L201 - 206, 208, 210,211	--------	9
-187	" " 5.6uH L207,209	--------	2
	Transistor 2SC403A X203 - 207	------	5
	" 2SC629 X201,202	--------	2

Ref. No.	Part No.	Description			Q'ty
		Diode 1T22A,J		D207 - 209 ----	3
		" 1T243		D201 - 206 ----	6
		Capacitor, ceramic			
	1-101-869	27PF	±5% 50V	C209 ----------	1
	-878	43PF	" "	C218 ----------	1
	-892	82PF	" "	C224 ----------	1
	-141	0.01uF	(+100% -0%	C217,223,229, 230,232,236 --	6
	-142	0.02uF	" "	C202 - 204,207, 208,210,212 - 214,216,219, 220,222,225, 226,228,231, 233,235,237 --	20
		Capacitor, electrolytic			
	1-121-439	1uF	15V	C238 ----------	1
	-371	10uF	25V	C201,205,206, 211,215,221, 227,234 ------	8
		Resistor, carbon			
	1-242-642	51 ohms	±5% RD¼UR	R206,215,221 --	3
	-665	470 "	" "	R233 ----------	1
	-673	1K "	" RD¼SR	R204,205,209, 210,213,214, 218,219,238 --	9
	-698	11K "	" RD¼UR	R236 ----------	1
	-680	2K "	" "	R237 ----------	1
	-689	4.7K "	" "	R223,228 ------	2
	-695	8.2K "	" RD¼SR	R203,234 ------	2
	-699	12K "	" "	R227 ----------	1
	-702	16K "	" "	R202,207,211, 216 ----------	4
	-708	30K "	" "	R235 ----------	1
	-721	100K "	" RD¼UR	R220,226,231 --	3
	1-244-741	680K "	" RD¼SR	R240 ----------	1
	1-242-656	200 "	RD¼UR	R225,230,232 --	3
	-673	1K "	"	R224,229 ------	2

Ref. No.	Part No.	Description			Q'ty
	1-242-695	8.2K ohms	RD¼UR	R208,212,217 --	3
	-699	12K "	"	R222 ----------	1

iii) Limiter & Detector Section

		Mounted Circuit Board, limiter & detector section ----------			1
	1-538-773	Printed Circuit Board, limiter & detector section ----------			1
	1-221-389	Resistor, adjustable 5K ohms (B)		R319 --	1
	1-403-291	Transformer, discriminator		IFT301 ------	1
	1-407-165	Inductor, micro 47uH		L301,302 -------	2
		Transistor 2SC403A		X301 - 303 -----	3
		" 2SC633		X304 ----------	1
		Diode 1T243		D301 - 304 -----	4
		" 1T22AJ		D305,306 -------	2
		Capacitor, ceramic			
	1-101-882	51PF	±5% 50V	C320 ----------	1
	-919	0.002uF	+80% -20% 25V	C304,305,309, 310 ----------	4
	-142	0.02uF	" "	C301 - 303,308, 312,313,321 ---	7
		Capacitor, styrol			
	1-103-603	120PF	±5% 50V	C317,318 -------	2
		Capacitor, electrolytic			
	1-121-334	10uF	15V	C314 ----------	1
	-371	10uF	25V	C325 ----------	1
	-373	30uF	25V	C319 ----------	1
	-338	50uF	15V	C306,323 -------	2
	-340	100uF	15V	C311,324 -------	2
	-343	1uF	50V	C322 ----------	1
		Resistor, carbon			
	1-244-649	100 ohms	±5% RD¼SR	R305,308,316, 317 ---------	4
	1-242-659	270 "	" RD¼UR	R306 ---------	1

Ref. No.	Part No.	Description				Q'ty
	1-244-666	510 ohms	±5%	RD¼SR	R329 ----------	1
	-669	680 "	"	"	R303,310,315 --	3
	-670	750 "	"	"	R318 ----------	1
	-673	1K "	"	"	R304,311 ------	2
	-680	2K "	"	"	R323,327,328 --	3
	-689	4.7K "	"	"	R313 ----------	1
	-691	5.6K "	"	"	R301 ----------	1
	-693	6.8K "	"	"	R320,321 ------	2
	-695	8.2K "	"	"	R307 ----------	1
	-699	12K "	"	"	R302,309 ------	2
	-701	15K "	"	"	R314 ----------	1
	-709	33K "	"	"	R322,324 ------	2
	-721	100K "	"	"	R325 ----------	1
	-725	150K "	"	"	R326 ----------	1
	1-242-649	100 "	"	RD¼UR	R312 ----------	1

iv) Muting Circuit Section

	Mounted Circuit Board, muting circuit --			1
1-538-774	Printed Circuit Board, muting circuit --			1
1-407-177	Inductor, micro 470uH		L401,402 ------	2
	Field Effect Transistor 2SK23		X401 ----	1
	Transistor 2SC633		X402 - 410 -----	9
	Diode 1T22AJ		D401 - 405 -----	5
	" 10D-05		D406 ----------	1
	Thermistor S-10K		Th401 ----------	1

Resistor, solid adjustable

1-221-997	2.2K ohms		R403 ----------	1

Capacitor, ceramic

1-101-864	20PF	±5%	50V	C402 ----------	1
-142	0.02uF	(+100%, -0%	"	C406 ----------	1

Capacitor, mylar

1-105-683	0.068uF	±10%	50V	C403 - 405 ----	3
-419	0.22uF	±20%	35V	C407 ----------	1

Ref. No.	Part No.	Description				Q'ty
		Capacitor, electrolytic				
	1-121-371	10uF	25V		C401 ----------	1
		Resistor, carbon				
	1-244-649	100 ohms	+5%	RD¼SR	R419 ----------	1
	-655	180 "	"	"	R424 ----------	1
	-656	200 "	"	"	R402,409,411 --	3
	-666	510 "	"	"	R431,427 ------	2
	-673	1K "	"	"	R423 ----------	1
	-693	6.8K "	"	"	R406 ----------	1
	-691	5.6K "	"	"	R418 ----------	1
	-695	8.2K "	"	"	R417 ----------	1
	-697	10K "	"	"	R405,415,420, 435,436 ------	5
	-701	15K "	"	"	R422 ----------	1
	-704	20K "	"	"	R426,428 ------	2
	-708	30K "	"	"	R408 ----------	1
	-714	51K "	"	"	R410,414,416 --	3
	-721	100K "	"	"	R412,413,425, 430,433 ------	5
	-732	300K "	"	"	R421 ----------	1
	-744	910K "	"	"	R401 ----------	1
	-715	56K "	"	"	R434,407 ------	2
	-713	47K "	"	"	R429 ----------	1
	-683	2.7K "	"	"	R404 ----------	1
	-713	47K "	"	"	R407 (Adjust)	1
	-714	51K "	"	"	R407 (")-	

V. MPX Decoder Section

	Mounted Circuit Board, MPX decoder -----	1
1-538-775	Printed Circuit Board, MPX decoder -----	1
1-221-389	Resistor, adjustable 5K ohms (B) R537 -	1
1-231-066	Filter, low pass ----------	1
1-409-138	Coil, trap L505 ----------	1
-139	Coil, trap L506 ----------	1
1-425-401	Transformer, MPX L503 ----------	1
-402	" " L504 ----------	1
-403	" " L501,502 ----------	2
1-515-101	Relay, reed REL-1 ----------	1

Ref. No.	Part No.	Description			Q'ty
		Transistor	2SC633	X501 - 503 --------	3
		"	2SC633	X504 - 513,515 ----	11
		"	2SC633	X514 ----------	1
		Diode	1T23J	D501,502 ----------	2
		"	1T22AJ	D503 - 507 --------	5
		Capacitor, styrol			
	1-103-605	150PF	±5% 50V	C504 ----------	1
	-611	270PF	" "	C521,522 ----------	2
	-575	4700PF	" "	C502,505,507 - 509, 513 ----------	6
		Capacitor, mylar			
	1-105-661-12	0.001uF	±10% 50V	C506,512 ----------	2
	-665-12	0.0022uF	" "	C529 ----------	1
	-681-12	0.047μF	" "	C514,515 ----------	2
	1-106-550-12	0.33uF	" 35V	C518,519,523,524 ---	4
	1-105-667-12	0.0033μF	" 50V	C516,517(Adjust) --	2
	-669-12	0.0047μF	" "	C516,517(")	
	-677-12	0.022μF	" "	C536,537(Adjust) --	2
	-667-12	0.0033μF	" "	C536,537(")	
		Capacitor, electrolytic			
	1-121-442	1uF	50V	C527,528 ----------	2
	-371	10uF	25V	C525,526 ----------	2
	-336	30uF	15V	C501 ----------	1
	-489	50uF	12V	C532 ----------	1
	-375	50uF	25V	C530 ----------	1
	-315	100uF	6V	C503 ----------	1
	-377	100uF	25V	C511,520 ----------	2
	-426	500uF	15V	C531 ----------	1
		Resistor, carbon			
	1-244-641	47 ohms	±5% RD¼SR	R574 ----------	1
	-649	100 "	" "	R516 ----------	1
	-658	240 "	" "	R506 ----------	1
	-666	510 "	" "	R519 - 522,551, 552,559,560, 563,564 --------	10
	-670	750 "	" "	R512 ----------	1

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Oct. 1970

Ref No.	Part No.	Description				Q'ty
	1-244-673	1K ohms	±5%	RD¼SR	R503,515,518, 525,526,533, 534 ----------	7
	-677	1.5K "	"	"	R539,540,577 ---	3
	-680	2K "	"	"	R538,541,542 ---	3
	-684	3K "	"	"	R517,543 - 546, 575 ----------	6
	-685	3.3K "	"	"	R523,524,576 ---	3
	-690	5.1K "	"	"	R514,557,558 ---	3
	-697	10K "	"	"	R535,536,553, 554,567,568, 573,578,579 ---	9
	-701	15K "	"	"	R555,556,561, 562,505 -------	5
	-704	20K "	"	"	R565,566 -------	2
	-708	30K "	"	"	R510 ----------	1
	-712	43K "	"	"	R509 ----------	1
	-714	51K "	"	"	R504 ----------	1
	-718	75K "	"	"	R507,513 -------	2
	-721	100K "	"	"	R508,511,527, 528,572 -------	5
	-734	360K "	"	"	R502 ----------	1
	-743	820K "	"	"	R529,530 -------	2
	-744	910K "	"	"	R549,550 -------	2
	-675	1.2K "	"	"	R501 ----------	1
	-649	100 "	"	"	R531,532(Adjust)	
	-656	200 "	"	"	R531,532(")	1
	-660	300 "	"	"	R531,532(")	
	-718	75K "	"	"	R547,548(Adjust)	
	-719	82K "	"	"	R547,548(")	1

vi) Power Supply Section

	Mounted Circuit Board, power supply ----		1
1-538-776	Printed Circuit Board, power supply ----		1
1-223-012	Resistor, adjustable; wire wound 500 ohms (B)	VR601 -------	1
1-526-502	Socket, power transistor ----------		1
	Transistor 2SD47	X601 ----------	1
	" 2SC470	X602 ----------	1
	" 2SC318	X603 ----------	1
	Diode 1T240	D602,603 --------	2
	" 10DB	D601 ----------	1

Ref. No.	Part No.	Description			Q'ty
		Capacitor, mylar			
	1-105-673	0.01uF	50V	C603 ----------	1
	-873	0.01uF	100V	C605 - 608 --------	4
		Capacitor, electrolytic			
	1-121-731	200uF	50V	C602 ----------	1
		Resistor, carbon			
	1-209-143	3.9 ohms	+5% R1	R608 ----------	1
	-164	390 "	" "	R609 ----------	1
	1-204-074	680 "	" "	R611 ----------	1
	1-203-033	1K "	" "	R610 ----------	1
	1-244-661	330 "	" RD¼SR	R604 ----------	1
	-675	1.2K "	" "	R605 ----------	1
	-689	4.7K "	" "	R501,603 --------	2
	-695	8.2K "	" "	R602 ----------	1
	1-209-044	100 "	" R1	R606 (Adjust)	
	-160	120 "	" "	R606 (")	
	1-204-276	150 "	" "	R606 (") --	1
	1-209-162	220 "	" "	R607 (Adjust)	
	-163	270 "	" "	R607 (")	
	1-204-277	330 "	" "	R607 (") --	1

vii) **General Section**

	Mounted Circuit Board, balun ----------	1
1-538-771	Printed Circuit Board, balun ----------	1
1-221-276	Resistor, variable 5K ohms (T) R241,330-	2
-779	" " " 10K " (B) R569,570-	2
1-222-113	Control, muting level with switch SW4 --	1
1-231-057	Encapsulated Component 0.033uF+120 ohms VR401 ----------	1
1-417-014-21	Balun (antenna matching transformer) B101	1
1-441-381	Power Transformer ----------	1
1-507-164	Jack, 4-pin ----------	1
1-514-369	Switch, lever; power ON/OFF SW1 -------	1
-338	" " ; mode SW3 -------	1
-370	" , rotary; hi-blend SW2 -------	1
1-517-025	Socket, pilot lamp ----------	3
1-518-061	Lamp, pilot PL3,4 ----------	2
1-514-524	Switch, slide; de-emphasis SW5 -------	1

Revised
Oct. 1970

Ref. No.	Part No.	Description	Q'ty
	1-518-062	Lamp, pilot PL5	1
	-070	" " (cylinder) PL1,2	2
	1-520-060	Meter, tuning M1	1
	-061	" , tuner input M2	1
	1-526-165	Socket, voltage selector VS	1
	1-532-145	Fuse, UL F	1
	1-533-051	Holder, lamp	2
	-048	Post, fuse	1
	1-534-330	Cord, power	1
	1-535-029	Terminal, test point TP2 - 4	3
		Capacitor, mylar	
	1-105-679	0.033uF 50V C535	1
	-683	0.068uF " C534	1
	-687	0.15uF " C533	1
		Capacitor, electrolytic	
	1-121-030	2000uF 50V C601	1
	-328	2000uF 35V C604	1
		Resistor, carbon	
	1-204-128	1.0 ohms ±5% RD1P R704,705	2
	1-244-818	5.1 " " RD½SP R702,703	2

* * * * * *

Additional Parts for Canada Model

2-047-256	Label, specification	1
-259	Label, fuse caution	1
-260	Label, CSA	1
2-029-991	Label, caution	1
1-532-164	Fuse	1
1-201-564	Resistor, composition RC½ 750K ohms R701	1
7-621-770-40	Screw, machine (+) B 3 x 10	1
3-701-041	Label, CSA	1

Ref. No.	Part No.	Description	Q'ty
	Additional Parts for General Model		
	2-047-255	Label, specification	1
	2-029-953	Label, voltage	1
	3-790-768-11	Manual, instruction	1
	1-532-164	Fuse	1
	1-534-241-15	Cord, power	1
	3-793-082	Supplement	1

FM STEREO TUNER ST-5000FW

Serial No. (USA Model); 85,751 and later (Canada Model); 75,061 and later (E Model); 55,651 and later	DATE: Sept. 20th, '68

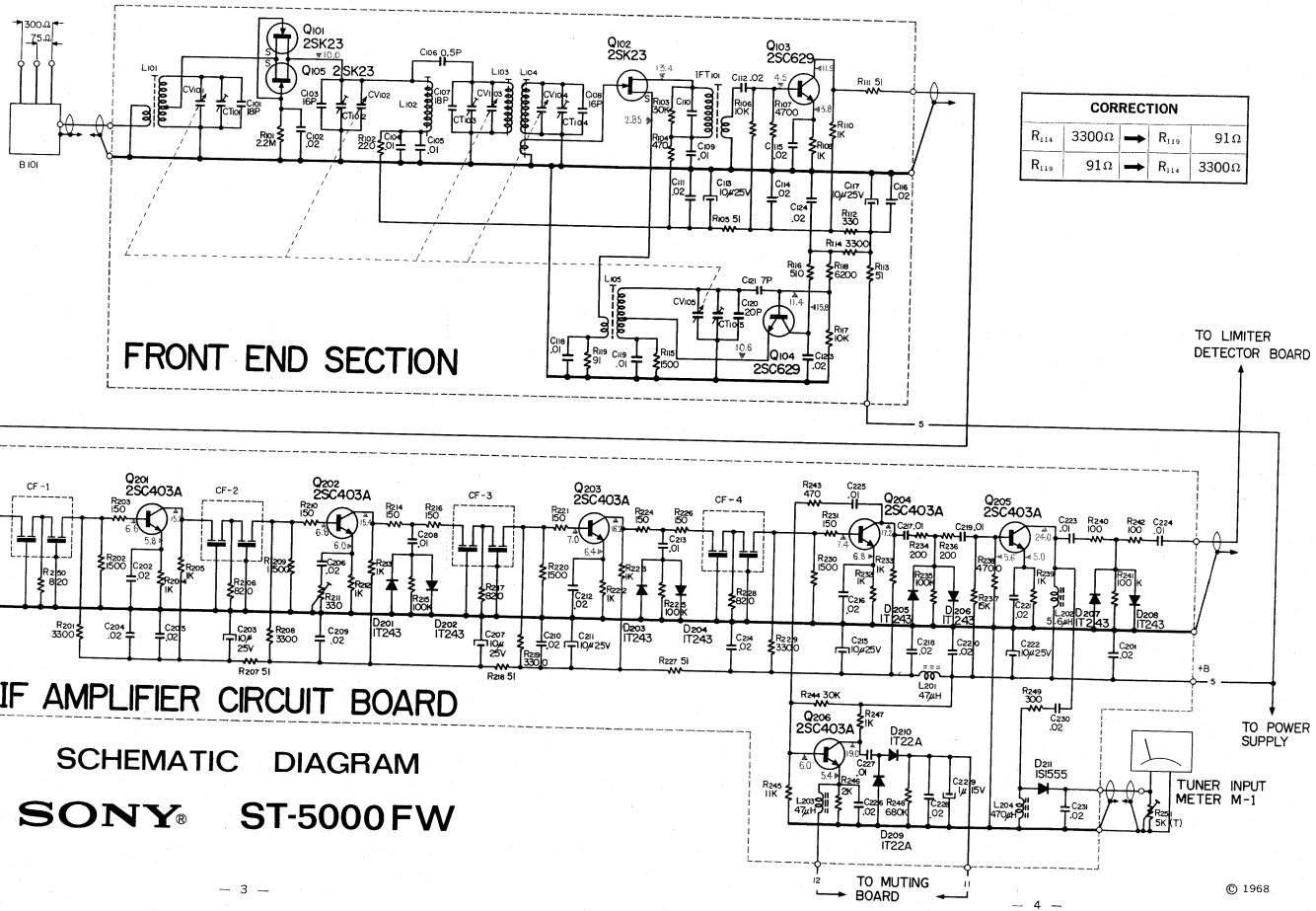
Subject: The new FRONT END and IF SECTION developed for ST-5000FW.

Purpose: To improve the sensitivity and stability.

Description: This bulletin provides the schematic and mounting diagrams.
NEW and OLD are interchangeable.

SONY
SERVICE MANUAL

in Japan


FRONT END SECTION
IF AMPLIFIER CIRCUIT BOARD
SCHEMATIC DIAGRAM
SONY® ST-5000FW
TO LIMITER DETECTOR BOARD
TO POWER SUPPLY
TUNER INPUT METER M-1
TO MUTING BOARD
CORRECTION
R114 3300Ω → R119 91Ω
R119 91Ω → R114 3300Ω

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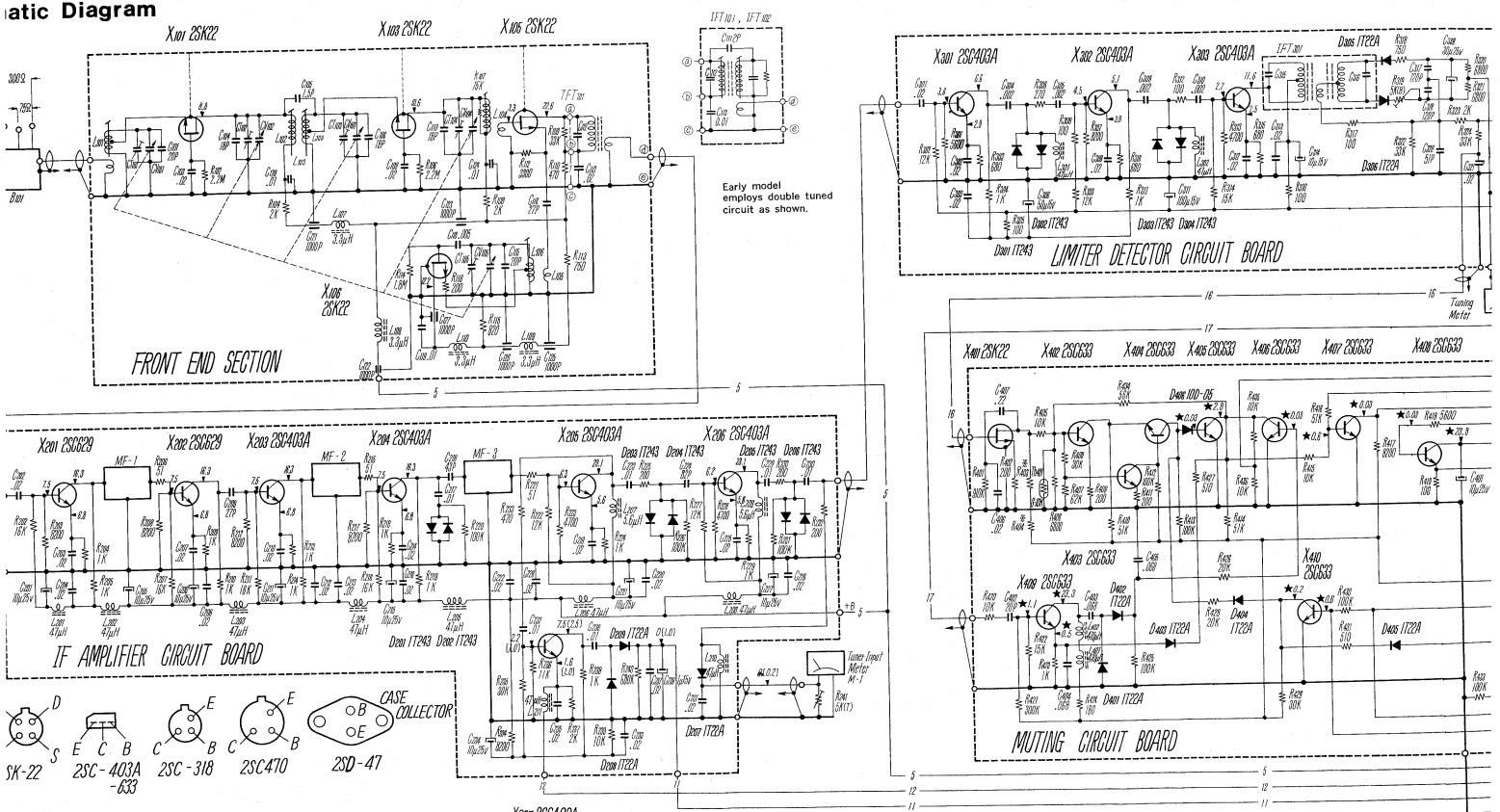
5000FW

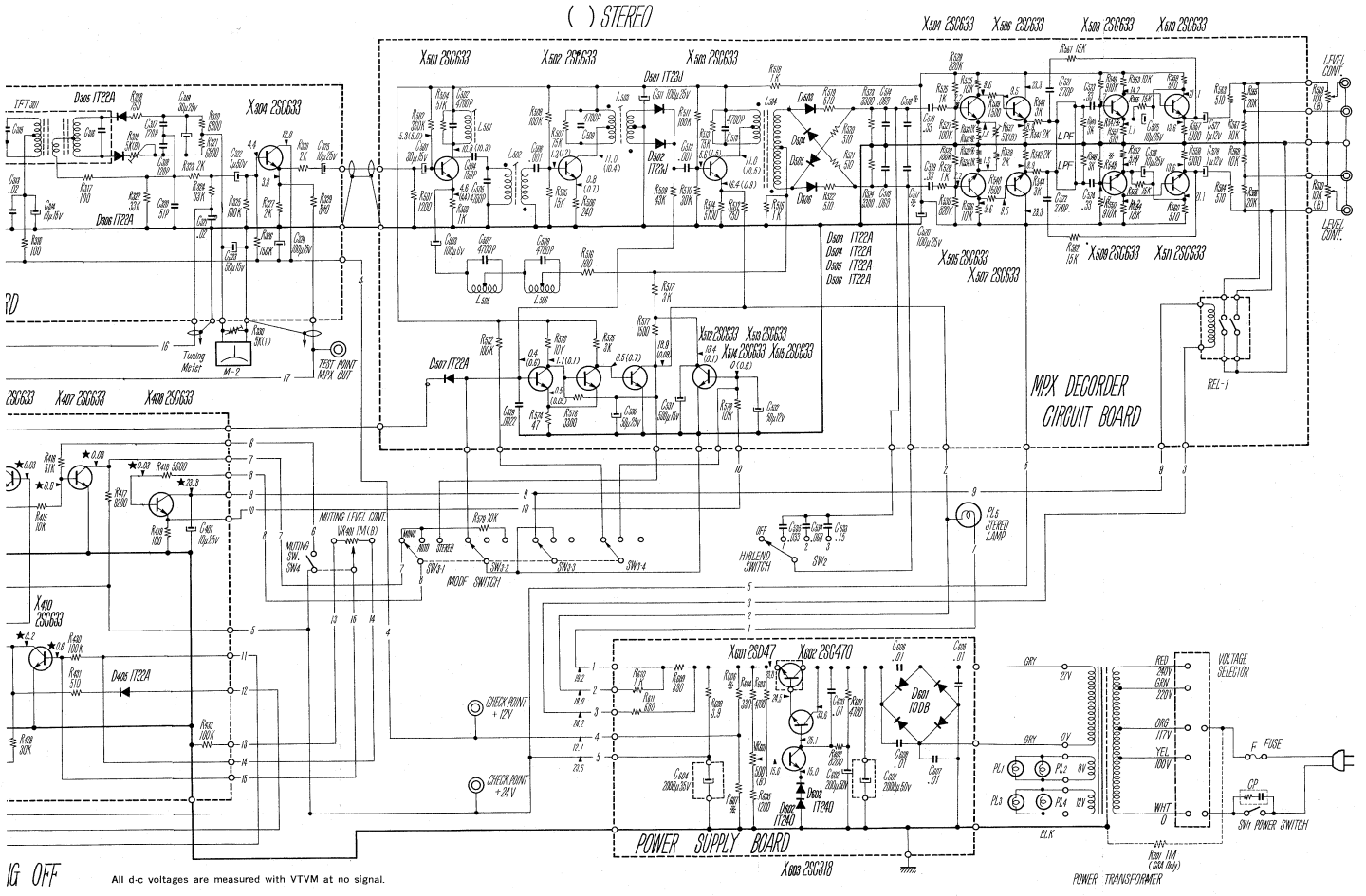
ıatic Diagram



* ; To be selected
In early model, R_{405} is 100 ohms and R_{447} is 100 K ohms.

★ MUTING OFF

All d-c voltages are r


( ) STEREO
MPX DECORDER CIRCUIT BOARD
POWER SUPPLY BOARD
TUNING METER
TEST POINT MPX OUT
MUTING LEVEL CONT.
MUTING SW.
MODE SWITCH
HIBLEND SWITCH
PLS STEREO LAMP
CHECK POINT +12V
CHECK POINT +24V
VOLTAGE SELECTOR
F. FUSE
SW POWER SWITCH
POWER TRANSFORMER
LEVEL CONT.
REL-1
IG OFF
All d-c voltages are measured with VTVM at no signal.
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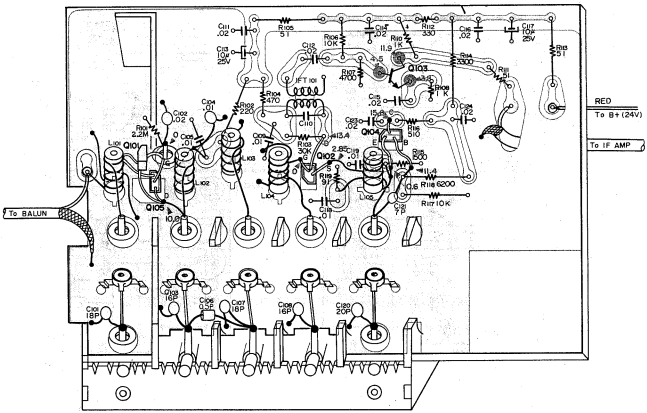
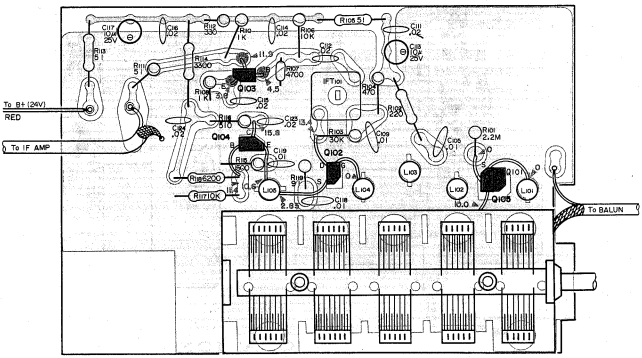
Mounting Diagram

Conductor Side



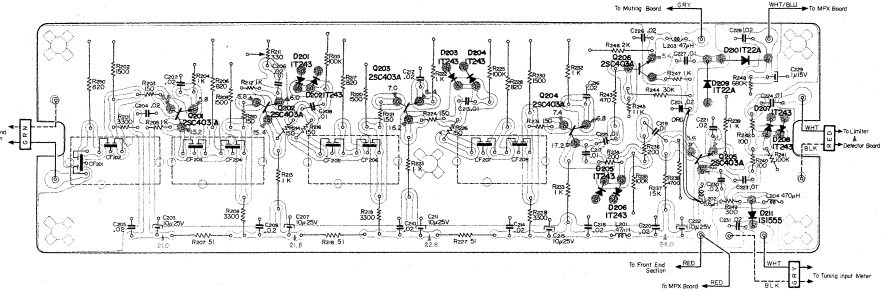
Component Side



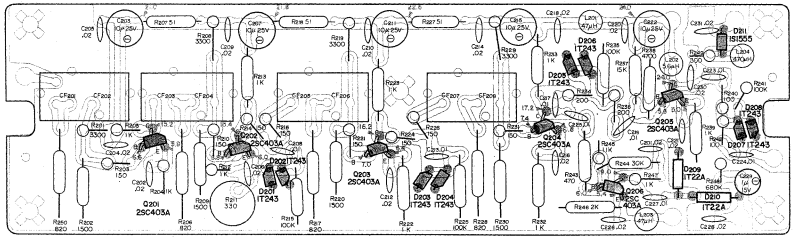
4C0608-3

Mounting Diagram

Conductor Side



Component Side



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SONY®

ST-5000FW

TA Service Bulletin No. 68-101

Serial No.		DATE
(UL) 85,751 (CSA) 75,061 (E) 55,651	and later	DATE : Sept. 20th. '68

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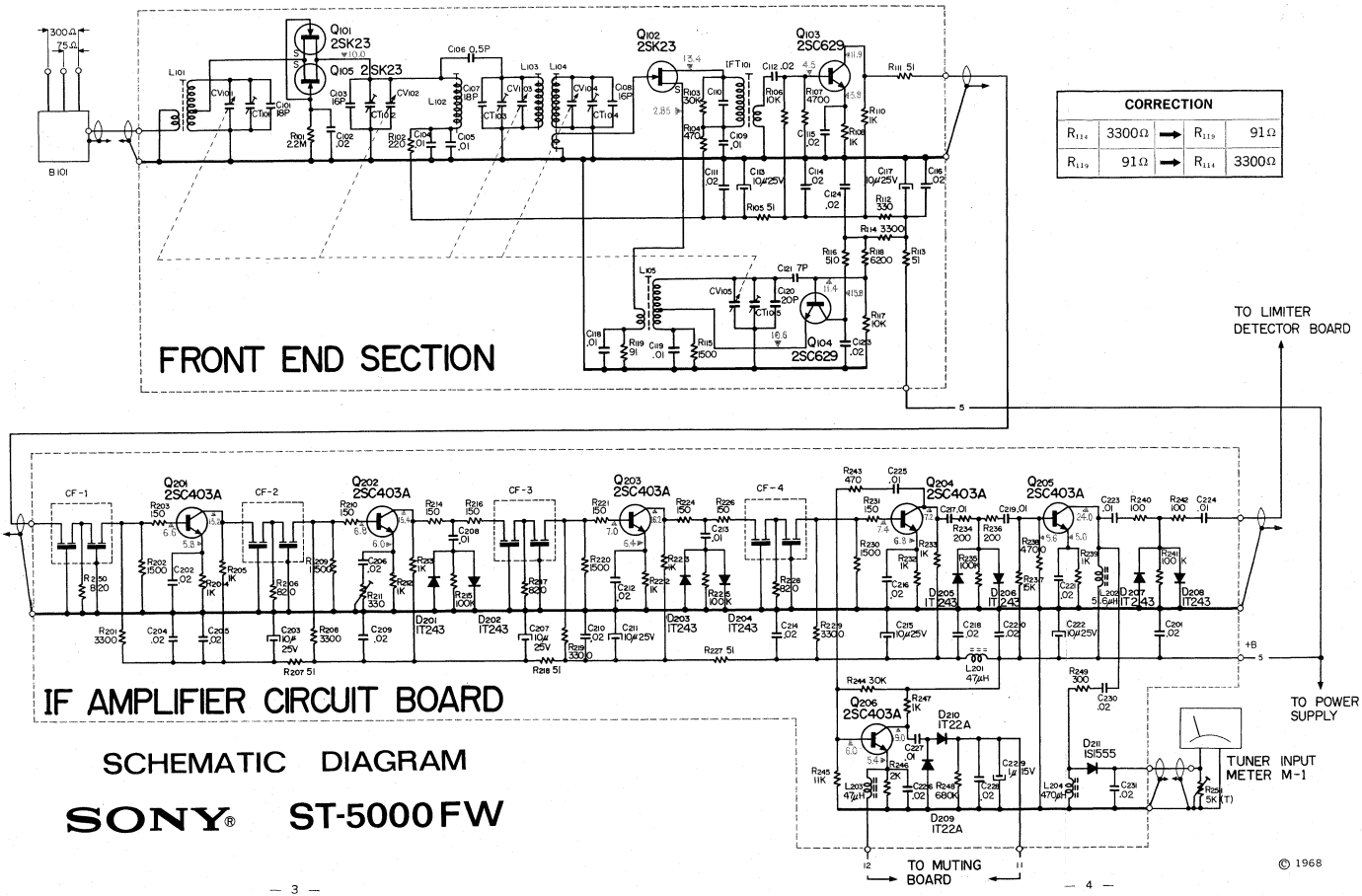
SONY CORPORATION



SCHEMATIC DIAGRAM

SONY® ST-5000FW

CORRECTION				
R_{114}	3300Ω	→	R_{119}	91Ω
R_{119}	91Ω	→	R_{114}	3300Ω

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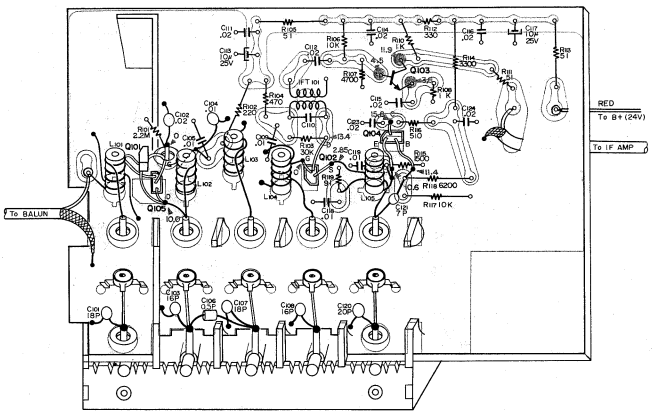
Mounting Diagram

Conductor Side



Component Side